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APR 22 1952

Vol. 102 Washington: 1952 No. 3302

ECHINODERMS FROM THE MARSHALL ISLANDS

By Austin H. Clark

The echinoderms from the Marshall Islands recorded in this report were collected during Operation Crossroads by the Oceanographic Section of Joint Task Force One under the direction of Commander Roger Revelle in 1946, and by the Bikini Scientific Resurvey under the direction of Capt. Christian L. Engleman in 1947. The number of species of echinoderms, exclusive of holothurians, in these two collections is 80, represented by 2,674 specimens. Although many of these have not previously been recorded from these islands, a number known from the group were not found, while others that certainly occur there still remain undiscovered.

Of the 80 species collected, 22 were found only in 1946 and 24 only in 1947; only 34, about 40 percent, were found in both years. It is therefore impossible to appraise the effects, if any, of the explosion of the atomic bombs. But the specimens of the 54 species collected in 1947 are all quite normal. On the basis of the scanty and inadequate data available it would seem that the bombs had no appreciable effect on the echinoderms.

Some of the species are represented by young individuals only. This is always the case in any survey of the echinoderm fauna of any tropical region. A few localities are found to yield nothing but young individuals of certain species at a given time, or possibly unless collections are made over a series of years.

A few of the records are from depths greater than any heretofore recorded for the species. These records are based mostly on dead material, which may have washed down from the shallower water of the reefs, though there is no reason to believe that the animals could not have lived at the depths given.

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The echinoderms represented in the collections, with the year or years in which they were found, are listed on page 299. Subsequent to the completion of this report some specimens collected in 1948 have come to hand. They have been noted in the text under Localities, and for convenience they have been included with the entries for 1947 in the list just mentioned.

This collection, unusually extensive for any region in the Polynesian area, was assembled by 16 members of the expeditions, none of whom had a special interest in the echinoderms. These were: Capt. R. H. Draeger, M. C., U. S. Navy; Lt. Comdr. Fred C. Ziesenhenne, U. S. N. R.; Capt. Earl S. Herald, U. S. Army; and Frederick M. Bayer; Vernon E. Brock; Frank Cali; Martin W. Johnson; Thomas F. Kohler; Harry S. Ladd; Joseph P. E. Morrison; R. Dana Russell; Leonard P. Schultz; William Randolph Taylor; Joshua R. Tracey; Douglas M. Whitaker; and Fred C. Zimmerman. It is a pleasure to thank these gentlemen and to congratulate them on the notable contribution they have made to our knowledge of the echinoderms of Polynesia.

Class CRINOIDEA

Family COMASTERIDAE

Genus COMASTER L. Agassiz

COMASTER GRACILIS (Hartlaub)

Actinometra gracilis HARTLAUB, Nachr. Ges. Göttingen, May 1890, pp. 170, 187 (description; Pulo Edam, near Batavia, Java).

Locality.—Bikini Atoll; 150–265 feet; August 7, 1947. One specimen, U.S.N.M. No. E. 7236.

Notes.—This specimen has 8 arms on each of the 5 rays, making 40 arms in all. In recording 11 specimens of *Comaster multifida* (J. Müller) from the Gilbert Islands Prof. Torsten Gislén expresses doubt in regard to the specific distinctness of *C. gracilis*. It is quite possible that *gracilis* will prove to be a synonym of *multifida*.

Genus COMANTHUS A. H. Clark

COMANTHUS BENNETTI (J. Müller)

Alecto bennetti J. MÜLLER, Monatsb. preuss. Akad. Wiss., 1841, p. 187 (description; locality unknown).

Locality.—Rongelap Atoll; Kieshiechi Island, lagoon side; Morrison, July 24, 1946. Two large specimens, U.S.N.M. Nos. E. 6995, E. 6996.

Family MARIAMETRIDAE

Genus STEPHANOMETRA A. H. Clark

STEPHANOMETRA INDICA PROTECTUS (Lütken)

Antedon protectus LÜTKEN, Mus. Godeffroy Cat., vol. 5, p. 190, 1874 (Tonga Islands; nomen nudum); *in* P. H. CARPENTER, Trans. Linn. Soc. (Zool.), ser. 2, vol. 2, p. 19, 1897 (character of the oral pinnules).

Localities.—Rongerik Atoll; Latoback Island; Bayer, Zimmerman, and Morrison, August 18, 20, 21, 1947; shallow water, the only depth given being 5 feet. Seven specimens, U.S.N.M. Nos. E. 7232–E. 7235, E. 7240, E. 7241.

Rongelap Atoll; on a coral head on the sandy bottom of the lagoon off the center of Tufa Island; 10 feet; Morrison, July 18, 1946. One large specimen, U.S.N.M. No. E. 7559.

Class ECHINOIDEA

Family CIDARIDAE

Genus EUCIDARIS Pomel

EUCIDARIS METULARIA (Lamarck)

Cidarites metularia LAMARCK, Histoire naturelle des animaux sans vertèbres, vol. 3, p. 56, 1816 (Ocean of the Great Indies, Mauritius, and Santo Domingo).

Localities.—Bikini Atoll; 200–290 feet; August 6, 1947. One small specimen, U.S.N.M. No. E. 7341.

Bikini Atoll; seaward side of Bikini Island; 150–275 feet; August 7, 1947. Two worn spines, slightly fusiform, the longest 31 mm. long, U.S.N.M. No. E. 7375.

Bikini Atoll; 800–900 feet; August 7, 1947. One small spine, slightly fusiform, 15 mm. long, U.S.N.M. No. E. 7376.

Bikini Atoll; Namu Island; outside reef; Johnson, April 4, 1946. One specimen, U.S.N.M. No. E. 7609.

Eniwetok Atoll; lagoon; Bogon Island, intertidal; Johnson, June 1, 1946. One specimen, U.S.N.M. No. E. 7614.

Rongerik Atoll; Rongerik Island; under rock in shallow water; Whitaker, August 20, 1947. One specimen, U.S.N.M. No. E. 7242.

Genus CHONDROCIDARIS A. Agassiz

CHONDROCIDARIS GIGANTEA A. Agassiz

Chondrocidaris gigantea A. AGASSIZ, Bull. Mus. Comp. Zool., vol. 1, No. 2, p. 18, 1863 (Hawaiian Islands).

Locality.—Bikini Atoll; 800–900 feet; August 7, 1947. A perfectly clean subambital spine, U.S.N.M. No. E. 7372.

Notes.—This spine agrees fairly well with some of the subambital

spines in a specimen of *Chondrocidaris gigantea* at hand from the Hawaiian Islands, and I have little hesitation in referring it to that species. It is 37 mm. long and 4 mm. thick without the winglike processes. The wings are in seven rows along the lateral and aboral side of the spine, those of one row alternating with those of the rows on either side. The adoral side of the spine is flattened and is without processes. The processes begin 3 mm. from the base. There are three or four in each row. Those nearest the base are high conical tubercles. From the base outward they become progressively elongated and flattened, the outermost being high thin ridges 4–6 mm. long with a slightly convex crest. The terminal 7–12 mm. on the spine carries five high thin ridges about 2 mm. high, highest at the proximal end, thence curving downward to the apex. The color is white with streaks and spots of light pink.

The spine resembles in a general way that from Lau, Fiji, figured by Dr. H. L. Clark under the name of *Chondrocidaris problepteryx* (Bernice P. Bishop Mus. Bull. 181, p. 314, pl. 41, fig. E, 1945), but the wings are more numerous, are not truncated distally, and are continued downward to the base.

Genus PHYLLACANTHUS Brandt

PHYLLACANTHUS IMPERIALIS (Lamarck)

Cidarites imperialis LAMARCK, Histoire naturelle des animaux sans vertèbres, vol. 3, p. 54, 1816 (Red Sea).

Locality.—Bikini Atoll; west end of the target area, 3 miles southwest by south of Bikini Island, in the lagoon; 150 feet; broken coral bottom; Morrison, August 26, 1947. Four spines, U.S.N.M. No. E. 7397.

Note.—These spines are of the typical form with three narrow evenly spaced white bands; the largest (broken) is 9 mm. in diameter.

The fact that the detached spines of this species and of *Chondrocidaris gigantea* and *Eucidaris metularia* were dredged in deep water does not necessarily indicate that the individuals from which these spines came lived at these depths. Although this condition is possible, it is more likely that they lived in shallower water and that after their death the spines were washed into the localities in which they were found.

Family ARBACIIDAE

Genus COELOPLEURUS L. Agassiz

COELOPLEURUS, sp.

Locality.—Bikini Atoll; 800–900 feet; August 7, 1947. Portion of a spine, U.S.N.M. No. E. 7370.

Note.—The spine fragment is 31 mm. long, 1.3 mm. in diameter at the larger end, and 1 mm. at the smaller. It is rounded triangular in section, smooth and polished, bright scarlet above, white below. The lower side has five equally spaced fine longitudinal ridges.

Family DIADEMATIDAE

Genus ECHINOTHRIX Peters

ECHINOTHRIX DIADEMA (Linné)

Echinus diadema LINNÉ, Systema naturae, ed. 10, vol. 1, p. 664, No. 7, 1758 (Indian Sea).

Localities.—Bikini Atoll; Namu Island, flats a little west of the northern point, under loose flat coral heads; Morrison, April 4, 1946. Two specimens, U.S.N.M. No. E. 7143.

Bikini Atoll; Bokonfuaaku Island, on ocean side of reef; Schultz, April 15, 1946. Four specimens, U.S.N.M. Nos. E. 7222, E. 7223, E. 7969, E. 7970.

Bikini Atoll; southeast corner of Bikini Island, lower intertidal zone, near outer reef, under rocks; Morrison, March 7, 1946. One specimen, U.S.N.M. No. E. 7006.

Eniwetok Atoll; Ziesenhenne, February 1, 2, 1946. One specimen, U.S.N.M. No. E. 7285.

Eniwetok Atoll; Arambiru Island, ocean reef; Schultz, June 3, 1946. Two specimens, U.S.N.M. Nos. E. 7224, E. 7225.

Eniwetok Atoll; outer reef at east end of Bogen Island; Morrison, May 21, 1946. Three specimens, U.S.N.M. No. E. 7536.

Eniwetok Atoll; outer reef flats, Pujiyoru Island; Morrison, June 2, 1946. One small specimen, U.S.N.M. No. E. 7546.

Johnston Island, outer reef; Bayer, August 28, 1947. Three specimens U.S.N.M. Nos. E. 7387, E. 7388.

ECHINOTHRIX CALAMARIS (Pallas)

Echinus calamaris PALLAS, Spicilegia zoologica, . . ., vol. 1, fasc. 10, p. 31, pl. 2, figs. 4–8, 1774.

Localities.—Eniwetok Atoll; East Rigili Island; Morrison, May 30, 1946. One specimen, U.S.N.M. No. E. 7583.

Rongelap Atoll; intertidal; Johnson, July 1946. One small specimen, U.S.N.M. No. E. 7611.

Johnston Island, outer reef; Bayer, August 28, 1947. Two specimens, U.S.N.M. Nos. E. 7220, E. 7389.

Family TEMNOPLEURIDAE

Genus TEMNOPLEURUS L. Agassiz

TEMNOPLEURUS TOREUMATICUS (Leske)

Cidaris toreumatica LESKE, Additamenta ad Jacobi Theodori Klein . . ., p. 155, pl. 10, fig. E, 1778.

Locality.—Rongelap lagoon; 23+ fathoms; Johnson, June 16, 1946. One small specimen, U.S.N.M. No. E. 7607.

Genus MESPILIA Desor

MESPILIA GLOBULUS (Linné)

Echinus globulus LINNÉ, Systema naturae, ed. 10, vol. 1, p. 664, No. 2, 1758 (Indian Ocean).

Localities.—Bikini Atoll; lagoon; Schultz, March 29, 1946. Two specimens, U.S.N.M., No. E. 7276.

Eniwetok Atoll; Lidilbut Island, lagoon reef; Schultz, June 1, 1946. Two fragments, U.S.N.M. No. E. 7137.

Bikini Atoll: 3 miles off Bikini Island, in lagoon; 150 feet; *Halimeda* bottom; Morrison, July 11, 1946. One specimen, U.S.N.M. No. E. 7299.

Bikini Atoll; about one-third of a mile southwest of the southeast point of Bikini Island; 27 feet; April 25, 1946. Two specimens, U.S.N.M. No. E. 7532.

Bikini Atoll; Namu Island, outer reef; Johnson, April 4, 1946. One specimen, U.S.N.M. No. E. 7604.

Bikini Atoll; Enirik Island; intertidal; Johnson, 1946. One specimen, U.S.N.M. No. E. 7623.

Eniwetok Atoll; south end of Rigili Island; Morrison; May 26, 1946. Two dead tests, U.S.N.M. No. E. 7558.

Eniwetok Atoll; East Rigili Island; Morrison, May 30, 1946. Three specimens, U.S.N.M. No. E. 7530.

Rongelap Atoll; lagoon, 2 miles west of Busch Island; 120 feet; Morrison, June 21, 1946. One specimen, U.S.N.M. No. E. 7531.

Rongelap Atoll; lagoon; 23+ fathoms; Johnson, June 16, 1946. One small specimen U.S.N.M. No. E. 7605.

Genus DESMECHINUS H. L. Clark

DESMECHINUS RUFUS (Bell)

Salmacis rufa BELL, Proc. Zool. Soc. London, 1894, p. 411, pl. 26, figs. 2, 3, (Macclesfield Bank 30–44 fathoms).

Locality—Bikini Atoll; 800–900 feet; August 7, 1947. One specimen, U.S.N.M. No. E. 7371.

Notes—The specimen is a bare test 9 mm. in diameter and 4 mm. high. The sculpture is strongly marked. The color is bright orange red fading to white on the oral surface. The region around the periproct is white, the white color running in a broad wedge down the interambulacral areas about halfway to the ambitus, and in narrower wedges about two-thirds as far down the midambulacral areas. There is a yellow-green spot in the middle of each genital. The interior of the test is white with a tapering red stripe running along each outer border of the interambulacral areas as far as the coronal ring. The lower half of the test is lighter and mottled red.

Family TOXOPNEUSTIDAE

Genus CYRTECHINUS Mortensen

CYRTECHINUS VERRUCULATUS (Lütken)

Psammechinus verruculatus LÜTKEN, Vid. Medd. Naturh. Foren. København, 1864, p. 166, 1865.

Localities.—Bikini Atoll; lagoon; 180–200 feet; Schultz, March 29, 1946. One specimen, U.S.N.M. No. E. 7286.

Bikini Atoll; in the lagoon, dredged about 3 miles off Bikini Island; 150 feet; *Halimeda* bottom; Morrison, July 11, 1946. Six specimens, U.S.N.M. No. E. 7300.

Bikini Atoll; lagoon; Morrison, August 26, 1947. Seven specimens, U.S.N.M. No. E. 7275.

Rongelap Atoll; lagoon; 23+ fathoms; Johnson, June 16, 1946. One specimen, U.S.N.M. No. E. 7606.

Genus TRIPNEUSTES L. Agassiz

TRIPNEUSTES GRATILLA (Linné)

Echinus gratilla LINNÉ, Systema naturae, ed. 10, vol. 1, p. 664, No. 4, 1758 (Indian Ocean).

Localities.—Eniwetok Atoll; Ziesenhenne, February 1, 2, 1946. One specimen, U.S.N.M. No. E. 7282.

Eniwetok Atoll; Arambiru Island, ocean reef; Schultz, June 3, 1946. Fifteen specimens, U.S.N.M. Nos. E. 7971, E. 7972.

Eniwetok Atoll; East Rigili Island; Morrison, May 30, 1946. One specimen, U.S.N.M. No. E. 6998.

Eniwetok Atoll; Pujiyoru Island, ocean reef; Morrison and Cali, June 2, 1946. Eleven specimens, U.S.N.M. No. E. 7308.

Johnston Island; through Dr. David Starr Jordan. One specimen, U.S.N.M. No. 5948.

Johnston Island, outer reef; Bayer, August 28, 1947. Three specimens, U.S.N.M. No. E. 7390.

Family PARASALENIIDAE

Genus PARASALENIA A. Agassiz

PARASALENIA GRATIOSA A. Agassiz

Parasalenia gratiosa A. Agassiz, Bull. Mus. Comp. Zool., vol. 1, p. 22, 1863 Kingsmill [Gilbert] and Society Islands).

Localities.—Bikini Atoll; lagoon; 180–200 feet; Schultz, March 29, 1946. Two specimens, U.S.N.M. No. E. 7263.

Bikini Atoll; lagoon, from staghorn coral at anchorage about 1 mile inside Bikini Island; July 16, 1947. One specimen, U.S.N.M. No. E. 7213.

Bikini Atoll; lagoon; 40–80 feet; Bayer, August 8, 1947. Fourteen specimens, U.S.N.M. No. E. 7219.

Bikini Atoll; lagoon; 30–75 feet; Bayer, August 15, 1947. Two specimens, U.S.N.M. No. E. 7216.

Bikini Atoll; lagoon; 50–140 feet; Bayer, August 15, 1947. One specimen, U.S.N.M. No. E. 7215.

Bikini Atoll; Bikini Island, lagoon reef; Bayer, August 24, 1947. One specimen, U.S.N.M. No. E. 7214.

Bikini Atoll; Bikini Island; Whitaker, August 1947. Nine specimens, U.S.N.M. No. E. 7163.

Eniwetok Atoll; lagoon; approximately 5 miles north of anchorage, about 3 miles west of Bogen Island; 90–120 feet; Taylor. One specimen, U.S.N.M. No. E. 7246.

Family ECHINOMETRIDAE

Genus ECHINOMETRA Gray

ECHINOMETRA MATHAEI (de Blainville)

Echinus mathaei de Blainville, Dict. sci. nat., vol. 37, Oursin, p. 94, 1825.

Localities.—Bikini Atoll; Bikini Island, lower intertidal zone near outer reefs, under rocks; Morrison, March 7, 1946. Three specimens, U.S.N.M. No. E. 7005.

Bikini Atoll; Bikini Island, under loose flat coral heads on flat inside of outer reefs near north point, at about low tide level; Morrison, April 4, 1948. Three specimens, U.S.N.M. No. E. 7003.

Bikini Atoll; outer reef at the north end of Bikini Island; Whitaker, July 1947. Seven specimens, U.S.N.M. No. E. 7406.

Bikini Atoll; drift at the south end of Bikini Island; Morrison, April 9, 1946. One dead test, U.S.N.M. No. E. 7297.

Bikini Atoll; flats inside outer reef, southeast side of Bikini Island; Morrison, April 5, 1946. One small specimen, U.S.N.M. No. E. 7572.

Bikini Atoll; outer reefs, south end of Bikini Island; Morrison, July 3, 1946. Two specimens, U.S.N.M. No. E. 7553.

Bikini Atoll; southeast corner of Enyu Island, flats inside outer reef above low tide line; Morrison, March 16, 1946. Two specimens, U.S.N.M. No. E. 7541.

Bikini Atoll; southeast corner of Enyu Island, rocky flats inside outer reef; Morrison, March 16, 1946. One specimen, U.S.N.M. No. E. 7579.

Bikini Atoll; Ourukaen Island, narrow reef on northeast side; Ladd and Tracey, May 3, 1946. Three specimens, U.S.N.M. Nos. E. 7580, E. 7581.

Bikini Atoll; outer reef, south (ocean) side of Bokororyuru Island; Morrison, April 30, 1946. One specimen, U.S.N.M. No. E. 7582.

Bikini Atoll; outer reef at south end of Bokororyuru Island; Ladd and Tracey, April 29, 1946. Sixteen specimens, U.S.N.M. Nos. E. 7548, E. 7549, E. 7550.

Bikini Atoll; east end of Namu Island, ocean drift; Morrison, April 14, 1946. Fragments, U.S.N.M. No. E. 7298.

Bikini Atoll; Eninman Island, outer reef flats; Morrison, July 17, 1947. Three specimens, U.S.N.M. No. E. 7274.

Eniwetok Atoll; Ziesenhenne, February 1, 2, 1946. Ten specimens, U.S.N.M. No. E. 7284.

Eniwetok Atoll; Arambiru Island; Schultz, June 3, 1946. Five specimens, U.S.N.M. No. E. 7260.

Eniwetok Atoll; outer reef flats, northeast side of Arambiru Island; Morrison, June 3, 1946. Nine specimens, U.S.N.M. Nos. E. 7560, E. 7561.

Eniwetok Island; south end of Rigili Island; Morrison, May 26, 1946. One dead test, U.S.N.M. No. E. 7555.

Eniwetok Atoll; East Rigili Island; Morrison, May 30, 1946. Twelve specimens, U.S.N.M. No. E. 7565.

Eniwetok Atoll; outer reef, east end of Bogen Island; Morrison, May 21, 1946. One specimen, U.S.N.M. No. E. 7554.

Eniwetok Atoll; outer reef flats, Pujiyoru Island; Morrison, June 2, 1946. Six specimens, U.S.N.M. No. E. 7547.

Eniwetok Atoll; outer reef, southwest side of Grinem Island; Morrison, May 29, 1946. Four specimens, U.S.N.M. No. E. 7551.

Eniwetok Atoll; flats on outer reef, southwest side of Buganegan Island; Morrison, May 28, 1946. Two specimens, U.S.N.M. No. E. 7552.

Kwajalein Atoll; Draeger, July 1946. Nine bare tests, U.S.N.M. No. E. 7244.

Rongerik Atoll; Eniwetak Island, under rocks on reef flat; Morrison, June 29, 1946. Two specimens, U.S.N.M. No. E. 7569.

Rongelap Atoll; Rongelap Island, outer reef flats; Morrison, June 17, 1946. One specimen, U.S.N.M. No. E. 7004.

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Rongelap Atoll; Rongelap Island, intertidal; Johnson, July 1946. One specimen, U.S.N.M. No. E. 7610.

Johnston Island, outer reef; Bayer, August 28, 1947. Four specimens, U.S.N.M. No. E. 7217.

Note.—These specimens are all small or medium sized. The largest, from the outer reef flats on the northeast side of Arambiru Island, Eniwetok Atoll, is 51 mm. in length, 40 mm. broad, and 32 mm. high (E. 7561).

ECHINOMETRA MATHAEI var. OBLONGA (de Blainville)

Echinus oblongus DE BLAINVILLE, Dict. sci. nat., vol. 37, Oursin, p. 95, 1825.

Localities.—Bikini Atoll; Bikini Island, from borings in coralline rock at and just behind the edge of the outer reef on the southeast side of the island; Morrison, April 5, 1948. Twenty-eight specimens, U.S.N.M. No. E. 7001.

Bikini Atoll; Bikini Island, outer reef opposite the center of the island; Ladd, April 17, 1946. Three specimens, U.S.N.M. No. E. 6700.

Bikini Atoll; Bikini Island, outer edge of reef opposite the east central part; Morrison, April 18, 1946. One specimen, U.S.N.M. No. E. 7002.

Bikini Atoll; Bikini Island; Herald, July 15, 1946. Two specimens, U.S.N.M. No. E. 7259.

Eniwetok Atoll; Lidilbut Island, near outer reef edge; Morrison, May 1, 1946. Five specimens, U.S.N.M. No. E. 7568.

Rongelap Atoll; Rongelap Island, outer reef flats; Johnson, July 1946. One specimen, U.S.N.M. No. E.7281.

Johnston Island, outer reef; Bayer, August 28, 1947. One specimen, U.S.N.M. No. E.7218.

Genus ECHINOSTREPHUS A. Agassiz

ECHINOSTREPHUS ACICULATUS A. Agassiz

Echinostrephus aciculatus A. AGASSIZ, Bull. Mus. Comp. Zool., vol. 1, p. 20, 1863 (Kingsmill [Gilbert] and Hawaiian Islands).

Localities.—Bikini Atoll; Eniairo Island; Bayer, July 21, 1947. One specimen, U.S.N.M. No. E. 7228.

Bikini Atoll; Namu Island, outer reef; Bayer, August 25, 1947. Four specimens, two in their excavations in coral rock, U.S.N.M. Nos. E. 7226, E. 7368, E. 7369.

Eniwetok Atoll; Arambiru Island, ocean reef; Schultz, June 3, 1946. Two specimens, U.S.N.M. Nos. E. 7227, E. 7266.

Eniwetok Atoll; south end of Rigili Island; Morrison, May 26, 1946. One dead test, U.S.N.M. No. E. 7556.

Eniwetok Atoll; East Rigili Island; Morrison, May 30, 1946. One specimen, U.S.N.M. No. E. 7529.

Eniwetok Atoll; Pujiyoru Island, outer reef flats; Morrison, June 2, 1946. One specimen, U.S.N.M. No. E. 7544.

Rongerik Atoll; Bock Island, outer reef; Bayer and Zimmerman, August 19, 1947. One specimen.

Note.—One of the specimens from Namu Island is at the bottom of a cylindrical hole with perfectly smooth sides, 80 mm. deep and 30 mm. in diameter (E. 7368).

Genus HETEROCENTROTUS Brandt

HETEROCENTROTUS TRIGONARIUS (Lamarck)

Echinus trigonarius LAMARCK, Histoire naturelle des animaux sans vertèbres, vol. 3, p. 51, 1816 (?Mediterranean).

Localities.—Bikini Atoll; reef off the southeast corner of Bikini Island; Morrison, March 7, 1946. Four specimens, U.S.N.M. Nos. E. 7007, E. 7008, E. 7533.

Bikini Atoll; outer reef, southern end of Bikini Island; Morrison, July 3, 1946. One specimen, U.S.N.M. No. E. 7534.

Bikini Atoll; Enyu Island, southeast corner, outer reef; Morrison, March 16, 1946. Five specimens, U.S.N.M. No. E. 6988.

Bikini Atoll; Namu Island, edge of outer reef; Morrison, April 4, 1946. Three specimens, U.S.N.M. Nos. E. 6992, E. 6993.

Bikini Atoll; Bikini Island, outer reef opposite the center of the island; Ladd, April 17, 1946. One specimen, U.S.N.M. No. E. 6991.

Bikini Atoll; Bikini Island, edge of reef opposite the east central part of the island; Morrison, April 18, 1946. Two specimens, U.S.N.M., No. E. 6989.

Bikini Atoll; Enyu Island, outer reef, south point of the island; Bayer, August 1, 1947. Two specimens, U.S.N.M., Nos. E. 7183, E. 7184.

Bikini Atoll; Namu Island, outer reef; Morrison, August 7, 1947. One specimen, U.S.N.M., No. E. 7207.

Bikini Atoll; Namu Island, outer reef; Bayer, August 25, 1947. Two specimens, U.S.N.M., Nos. E. 7179, E. 7180.

Eniwetok Atoll; Ziesenhenne, February 1, 2, 1946. One specimen, U.S.N.M., No. E. 7283.

Eniwetok Atoll; Arambiru Island, ocean reef; Schultz, June 3, 1946. Two specimens, U.S.N.M., Nos. E. 7967, E. 7968.

Eniwetok Atoll; Pujiyoru Island, ocean reef; Morrison, June 2, 1946. Two specimens, U.S.N.M., Nos. E. 7965, E. 7966.

Eniwetok Atoll; flats on east side near south end of Eniwetok Island; Morrison, May 20, 1946. One specimen, U.S.N.M., No. E. 7535.

Eniwetok Island; Grinem Island, outer reef on southwest side; Morrison, May 29, 1946. Seven specimens, U.S.N.M., Nos. E. 6990, E. 6994.

Eniwetok Atoll; Lidilbut Island, near outer reef edge; Morrison, May 1, 1946. Two small specimens, U.S.N.M., No. E. 7557.

Rongelap Atoll; 2 miles west of Busch Island; 120 feet; Taylor, June 21, 1946. One small dead test, U.S.N.M., No. E. 7564.

Rongelap Atoll; Kabelle Island; lithothamnion ridge, intertidal; Johnson, July 28, 1946. One small specimen, U.S.N.M., No. E. 7603.

Johnston Island; outer reef edge, northwest side; Bayer, August 28, 29, 1947. Two specimens, U.S.N.M., Nos. E. 7181, E. 7182.

HETEROCENTROTUS MAMMILLATUS (Linné)

Echinus mamillatus LINNÉ, Systema naturae, ed. 10, vol. 1, p. 664, No. 9, 1758 (no locality).

Localities.—Johnston Island; through David Starr Jordan. One specimen, U.S.N.M., No. E. 5949.

Johnston Island, outer reef edge on the northwest side of the island; Bayer, August 28, 1947. Twenty-four specimens, U.S.N.M., Nos. E. 7185–E. 7206, E. 7237, E. 7316.

Family CLYPEASTRIDAE

Genus CLYPEASTER Lamarck

CLYPEASTER RETICULATUS (Linné)

Echinus reticulatus LINNÉ, Systema naturae, ed. 10, vol. 1, p. 666, No. 15, 1758 (American Ocean).

Locality.—Bikini Atoll; Bikini Island; 150–265 feet; August 7, 1947. One specimen, U.S.N.M. No. E. 7262.

Family LAGANIDAE

Genus LAGANUM Linck

LAGANUM DEPRESSUM L. Agassiz

Laganum depressum L. AGASSIZ, Monographie des Scutellidae, p. 110, pl. 23, figs. 1–7, 1841 (Moluccas).

Localities.—Bikini Atoll; about one-fourth mile southwest of the southeast point of Bikini Island; 21 feet; sandy bottom with Foraminifera; Morrison, April 25, 1946. Thirty-two specimens, U.S.N.M., Nos. E. 7505, E. 7508, E. 7294.

Bikini Atoll; one-third of a mile southwest of the southeast point of Bikini Island; 21 feet; Morrison, April 25, 1946. Three specimens, U.S.N.M., No. E. 7291.

Bikini Atoll; one-third of a mile west of the southeast point of Bikini Island; 24 feet; sandy bottom; Morrison, April 23, 1946. Two specimens, U.S.N.M., No. E. 7507.

Bikini Atoll; one-third of a mile southwest of the southeast point of Bikini Island; 27 feet; sandy bottom; Morrison, April 25, 1946. Five specimens, U.S.N.M., Nos. E. 7510, E. 7577.

Bikini Atoll; one-third of a mile west of the southeast point of Bikini Island; 30 feet; coral and foraminiferal sand; Morrison, April 23, 1946. Seventeen specimens, U.S.N.M., Nos. E. 6999, E. 7511.

Bikini Atoll; one-third of a mile west of the southeast point of Bikini Island; 36–42 feet; Morrison, April 23, 1946. Four specimens.

Bikini Atoll; one-half mile south of the west end of Bikini Island, in the lagoon; 150 feet; sandy bottom with *Halimeda;* Morrison, August 7, 1946. One specimen, U.S.N.M., No. E. 7293.

Bikini Atoll; three-fourths of a mile south of the west end of Bikini Island; 90 feet; sandy bottom; Morrison, August 26, 1947. Two specimens, U.S.N.M., No. E. 7238.

Bikini Atoll; south of the west end of Bikini Island; coral-algae bottom; Morrison, April 23, 1946. Two specimens, U.S.N.M., No. E. 7292.

Bikini Atoll; in the lagoon 3 miles off Bikini Island; 150 feet; *Halimeda* bottom; Morrison, July 11, 1946. Four specimens, U.S.N.M. Nos. E. 7295, E. 7296.

Bikini Atoll; 4 miles south of the west end of Bikini Island; 168 feet; Morrison, April 25, 1946. One specimen, U.S.N.M. No. E. 7265.

Bikini Atoll; in the lagoon one-eighth to one-fourth mile offshore inside Bokonfuaaku Island; 18–30 feet; foraminiferal sand covering rock bottom; Morrison, July 11, 1946. Eleven small specimens, U.S.N.M. No. E. 7509.

Eniwetok Atoll; Pujiyoru Island, lagoon reef; Schultz, June 2, 1946. Fragments, U.S.N.M. No. E. 7512.

Eniwetok Atoll; in the lagoon approximately 5 miles north of the anchorage, about 3 miles west of Bogen Island; 90–120 feet; Taylor. Six specimens, U.S.N.M. No. E. 7247.

Rongerik Atoll; ocean side of Rongerik Island; August 13, 1947. Two specimens, U.S.N.M. No. E. 7239.

Rongelap Atoll; lagoon; 23+ fathoms; Johnson, June 16, 1946. One specimen, U.S.N.M. No. E. 7608.

Note.—One of the specimens from about one-fourth mile southwest of the southeast point of Bikini Island has the petals broadly outlined in purple.

Family FIBULARIIDAE

Genus FIBULARIA Lamarck

FIBULARIA AUSTRALIS Desmoulins

Fibularia australis Desmoulins, Études sur les Échinides, p. 240, 1837 (southern seas).

Localities.—Bikini Atoll; 3 miles off Bikini Island, in the lagoon; 150 feet; *Halimeda* bottom; Morrison, July 11, 1946. Four specimens, U.S.N.M. No. E. 7303.

Eniwetok Atoll; north end of Bogon Island; Draeger, 1948. Eighteen specimens, U.S.N.M. No. E. 7814.

Eniwetok Atoll; south end of Rigili Island; Morrison, May 25, 1946. Eleven specimens, U.S.N.M. No. E. 7495.

Rongerik Atoll; in drift on the sandy beach at the north end of Bock Island; Morrison, August 19, 1947. Twenty specimens, U.S.N.M. Nos. E. 7587, 7816.

Rongelap Atoll; sandy flats on the lagoon side of Kabelle Island; Morrison, June 20, 1946. One specimen, U.S.N.M. No. E. 7496.

FIBULARIA OVULUM (Linné)

Echinus ovulum LINNÉ, Systema naturae, ed. 13, vol. 1, pt. 6, p. 3194, No. 83, 1788 (no locality).

Localities.—Bikini Atoll; in the lagoon, one-half mile south of the west end of Bikini Island; 150 feet; sandy bottom with *Halimeda;* Morrison, August 7, 1946. One specimen, U.S.N.M. No. E. 7304.

Bikini Atoll; a mile and a half south of the west end of Bikini Island; 72 feet; coral and sand bottom; Morrison, April 4, 1946. Two specimens, U.S.N.M. No. E. 7305.

Bikini Atoll; west side of Arriikan Island; Morrison, May 14, 1946. One specimen, U.S.N.M. No. E. 7503.

Eniwetok Atoll; north side of Pujiyoru Island, at high tide line; Morrison, June 2, 1946. One specimen, U.S.N.M. No. E. 7306.

Eniwetok Atoll; south end of Rigili Island; Morrison, May 25, 1946. Thirty specimens, U.S.N.M. Nos. E. 7497, E. 7500, E. 7829.

Eniwetok Atoll; in the lagoon approximately 5 miles north of the anchorage, about 3 miles west of Bogen Island; 90–120 feet; Taylor. Three specimens, U.S.N.M. No. E. 7249.

Eniwetok Atoll; north end of Bogen Island; Draeger, 1948. One specimen, U.S.N.M. No. E. 7815.

Eniwetok Atoll; islet west of Elugelab Island; Draeger, 1948. Eleven specimens, U.S.N.M. No. E. 7826.

Rongerik Atoll; lagoon side of Bock Island; Morrison, June 27, 1946. Two specimens, U.S.N.M. No. E. 7303.

Rongerik Atoll; in drift on the sandy beach at the north end of Bock Island; Morrison, August 19, 1947. One thousand six hundred and two specimens, U.S.N.M. Nos. E. 7586, E. 7813, E. 7824.

FIBULARIA VOLVA L. Agassiz and Desor

Fibularia volva L. AGASSIZ and DESOR, Ann. Sci. Nat., ser. 3, vol. 7, p. 142, 1847 (Red Sea).

Localities.—Bikini Atoll; in the lagoon; Morrison, August 26, 1947. Two specimens, U.S.N.M. No. E. 7277.

Eniwetok Atoll; islet west of Elugelab Island; Draeger, 1948. One specimen, U.S.N.M. No. E. 7830.

Rongelap Atoll; sandy flats on the lagoon side of Kabelle Island; Morrison, June 20, 1946. Seven specimens, U.S.N.M. No. E. 7498.

Rongerik Atoll; in drift on the sandy beach at the north end of Bock Island; Morrison, August 19, 1946. Sixteen specimens, U.S.N.M. Nos. E. 7589, E. 7817, E. 7821.

FIBULARIA ACUTA Yoshiwara

Fibularia acuta YOSHIWARA, Annot. Zool. Japon., vol. 2, p. 60, 1898.

Rongerik Atoll; north end of Bock Island; Morrison, August 19, 1948. Two specimens, U.S.N.M. No. E. 7818.

Genus ECHINOCYAMUS van Phelsum

ECHINOCYAMUS INCERTUS H. L. Clark

Echinocyamus incertus H. L. CLARK, Mem. Mus. Comp. Zool., vol. 46, No. 1, p. 64, pl. 128, figs. 1–3, 1914 (*Albatross* station 4045, off Kawaihae Light, Hawaii, 147–198 fathoms).

Locality.—Bikini Atoll; 800–900 feet; August 7, 1947. One specimen, U.S.N.M. No. E. 7374.

Note.—This specimen is 7 mm. long, 5 mm. in maximum width, and 2.5 mm. high, a little larger than the type specimen.

ECHINOCYAMUS MEGAPETALUS H. L. Clark

Echinocyamus megapetalus H. L. CLARK, Mem. Mus. Comp. Zool., vol. 46, No. 1, p. 60, pl. 128, figs. 5–8, 1914 (Mauritius).

Localities.—Eniwetok Atoll; south end of Rigili Island; Morrison, May 25, 1946. One specimen, U.S.N.M. No. E. 7501.

Eniwetok Atoll; Chinieero Island; Draeger, 1948. Six specimens, U.S.N.M. No. E. 7827.

Bikini Atoll; Namu Island; Morrison, March 1, 1946. One specimen, U.S.N.M. No. E. 7828.

Rongerik Atoll; in drift on the sandy beach at the north end of Bock Island; Morrison, August 19, 1947. One hundred thirty-four specimens, U.S.N.M. Nos. E. 7590, E. 7819, E. 7825.

Rongerik Atoll; Latoback Island, northeast side, just above the high-tide line; Morrison, June 28, 1946. One specimen, U.S.N.M. No. E. 7499.

Note.—The specimen from Latoback Island, Rongerik Atoll, is 6 mm. long, 4 mm. wide, and 2.5 mm. high.

ECHINOCYAMUS ELONGATUS H. L. Clark

Echinocyamus elongatus H. L. CLARK, Mem. Mus. Comp. Zool., vol. 46, No. 1, p. 61, pl. 126, figs. 9–11, 1914 (*Albatross* station 3846, south coast of Molokai, Hawaiian Islands, 117–110 meters).

Locality.—Bikini Atoll; west side of Arriikan Island; Morrison, May 14, 1946. Eight specimens, U.S.N.M. No. E. 7502.

Family ECHINONEIDAE

Genus ECHINONEUS van Phelsum

ECHINONEUS ABNORMALIS de Loriol

Echinoneus abnormalis DE LORIOL, Mém. soc. phys. nat. hist. Genève, vol. 28, No. 8, p. 41, 1883 (Mauritius).

Locality.—Eniwetok Atoll; east side of Rigili Island; Morrison, May 30, 1946. One specimen, U.S.N.M. No. E. 7488.

Note.—This specimen is large, 50 mm. long, 42 mm. wide, and 28 mm. high.

ECHINONEUS CYCLOSTOMUS Leske

Echinoneus cyclostomus LESKE, Additamenta ad Jacobi Theodori Klein, p. 173, pl. 37, figs. 4, 5, 1778.

Localities.—Bikini Atoll; Eniairo Island; Bayer, July 21, 1947. One specimen, U.S.N.M. No. E. 7267.

Bikini Atoll; ocean drift on the west part of the north side of Namu Island; Morrison, March 30, 1946. One specimen, U.S.N.M. No. E. 7302.

Bikini Atoll; drift on the ocean side of Namu Island; Morrison, April 14, 1946. One specimen, U.S.N.M. No. E. 7301.

Bikini Atoll; rocky flats inside the outer reef, southeast corner of Enyu Island, near low tide line; Morrison, March 16, 1946. One specimen, U.S.N.M. No. E. 7493.

Eniwetok Atoll; east side of Rigili Island; Morrison, May 30, 1946. One specimen, U.S.N.M. No. E. 7489.

Eniwetok Atoll; south end of Rigili Island; Morrison, May 25, 1946. One specimen, U.S.N.M. No. E. 7494.

Rongelap Atoll; outer reef flat of Rongelap Island; Johnson, July 1946. Two large specimens, U.S.N.M. No. E. 7280.

Rongerik Atoll; in drift on sandy beach at the north end of Bock Island; Morrison, August 19, 1947. Eighteen specimens, U.S.N.M. Nos. E. 7589, E. 7820.

Family NUCLEOLITIDAE

Genus ECHINOLAMPAS Gray

ECHINOLAMPAS ALEXANDRI de Loriol

Echinolampas alexandri DE LORIOL, Mém. soc. phys. nat. hist. Genève, vol. 24, p. 660, 1876 (Mauritius).

Localities.—Bikini Atoll; in the lagoon; 180–200 feet; Schultz, March 29, 1946. One specimen, U.S.N.M. No. E. 7279.

Bikini Atoll; 4 miles south of the west end of Bikini Island; 180 feet; Morrison, April 4, 1946. One specimen, U.S.N.M. No. E. 7278.

Bikini Atoll; one-third of a mile west of the southeast point of

Bikini Island; 30 feet; coral and foraminiferal sand bottom; Morrison, April 23, 1947. One very young specimen, U.S.N.M. No. E. 7506.

Notes.—The very small specimen (E. 7506) bears little resemblance to the adult, but instead suggests a small slender spined *Echinometra.* It is slightly oval, two-thirds as broad as long, and twice as long as high, with the aboral surface gently convex. It measures 7 mm. in length, 5.5 mm. in width, and 3.5 mm. in height.

The genitals are fused into a somewhat irregular five-sided plate 1.5 mm. long and 1 mm. broad. The posterior genital appears to be much larger than the others and bears a large perforated tubercle surrounded by a broad areole. Numerous other tubercles about half as large are scattered over the surface of the combined genitals. There are four large madreporic pores, each on the summit of a short tube, the four tubes crowded into a square with rounded angles and slight notches on the sides. No pores are visible in the genital plates.

The triangular oculars are very small, each situated on one of the sides of the combined genitals.

There are from 10 to 12 large interambulacrals in each column. These are at first hexagonal, toward the ambitus gradually becoming transversely elongated, and at the ambitus about twice as broad as long; below the ambitus they gradually become shorter again. Aborally each interambulacral plate bears a large central perforated tubercle surrounded by a broad areole margined by a circlet of small and glassy, usually contiguous, tubercles. On the broad interambulacral plates at and below the ambitus there are commonly two tubercles to a plate.

The ambulacrals are at first minute. After a series varying from 12 to 19, much larger ones, each with a large central tubercle, appear, and soon all are large with usually three pores in a slightly curved line along the outer border. At the ambitus the ambulacrals are hexagonal and about as high as the much broader interambulacrals, with central tubercles about as broad as those of the latter. On the aboral surface the very small ambulacrals always extend farther down on one side of the ambulacral areas than on the other.

There is a single glassy spheridium situated in a deep and capacious pit at the adoral end of each ambulacrum.

The peristome is circular, 2 mm. in diameter, densely and evenly covered with very minute spinous plates. The mouth is closed and no teeth are visible.

The periproct is large, situated just below the ambitus and sloping slightly inward, diamond shaped with rounded angles, transversely elongated, 2.3 mm. wide and 1.4 mm. high. Most of its surface is covered by three large plates of which the two outer reach halfway

from the lateral apices to the anterior angle. The remaining area, from the anterior angle about halfway to the posterior, and halfway to the lateral apices, is covered by several much smaller plates.

The primary spines are 2 mm. long, cylindrical or slightly tapering, with eight high and rounded longitudinal ridges. In section they resemble the spine of *Echinolampas alexandri* var. *sibogae* figured by Mortensen (Monograph of the Echinoidea, vol. 4, part 1, p. 281, fig. 272, c. 1948). The secondary spines are very fine, 0.7 mm. long and cylindrical.

The ophicephalous pedicellariae resemble the one from *E. a. sibogae* figured by Mortensen (pl. 14, figs. 5, 6).

The color is light olive-green. The test is yellowish white with some olive-green patches and a purple patch on the genitals.

This little specimen bears a close resemblance to the young *Echinolampas depressa* figured by Agassiz (Revision of the Echini, pl. 16, figs. 1, 2, 3, 1872), but it is much lower than is shown in figure 3, in lateral view being more like the larger specimen shown in figure 10. The periproctal structure is as shown in figure 14, but the three large plates are smaller.

Dr. Morrison's specimen (E. 7278) is 77 mm. long, 69 mm. in maximum width, 35 mm. high at the apical system, and 36 mm. high at the posterior end. It agrees well with a specimen from Tavoy figured and described by Koehler, but is slightly larger and more depressed.

Dr. Schultz's specimen (E. 7279) agrees with the preceding, but is somewhat smaller.

This species has heretofore been reported only from Mauritius, Ceylon, and the Bay of Bengal.

Family SPATANGIDAE

Genus METALIA Gray

METALIA DICRANA H. L. Clark

Metalia dicrana H. L. Clark, Mem. Mus. Comp. Zool., vol. 46, No. 2, p. 211, pl. 146, fig. 16, pl. 160, figs. 1–4, 1917 (Panglao, Bohol Province, Philippines).

Localities.—Bikini Atoll; in the lagoon, about one-eighth to one-fourth mile offshore inside Bokonfuaaku Island; 18–30 feet; Morrison, July 11, 1946. One specimen, U.S.N.M. No. E. 7487.

Eniwetok Atoll; in the lagoon, approximately 5 miles north of the south anchorage, about 3 miles west of Bogen Island; 90–120 feet; Taylor. Seven specimens, U.S.N.M. No. E. 7245.

Notes.—The specimen from Bikini is 26 mm. long, 23 mm. wide,

and 17 mm. high. The seven specimens from Eniwetok are small, about 17 mm. long, and are very variable in shape.

Genus BRISSUS Leske

BRISSUS LATECARINATUS (Leske)

Spatangus brissus var. *latecarinatus* LESKE, Additamenta ad Jacobi Theodori Klein, pp. XX, 185, 1778.

Localities.—Bikini Atoll; Namu Island; drift on the north side of the east end; Morrison, April 14, 1946. Two bare tests, U.S.N.M. No. E. 7258.

Bikini Atoll; blasted out of a coral head in making a channel across the flats just west of the beach on the west side of Bokororyuru Island; Morrison, August 12, 1946. Fragments, U.S.N.M. No. E. 7290.

Rongelap Atoll; lagoon side of Eniaetok Island; 12 feet; Brock and Herald, July 20, 1946. One specimen, U.S.N.M. No. E. 7492.

Note.—The two specimens from Namu Island (E. 7258) are 110 and 115 mm. in length.

Genus MARETIA Gray

MARETIA OVATA (Leske)

Spatangus ovatus LESKE, Additamenta ad Jacobi Theodori Klein, p. 188, pl. 49, figs. 12, 13, 1778.

Localities.—Bikini Atoll; 50–80 feet; August 15, 1947. One specimen, U.S.N.M. No. E. 7256.

Bikini Atoll; in the lagoon; 100–140 feet; August 6, 1947. Three small broken specimens, U.S.N.M. No. E. 7373.

Eniwetok Atoll; Lidilbut Island, north side, outer reef flats, under sand; Morrison, June 1, 1946. One specimen with parasitic gastropods, U.S.N.M. No. E. 7504.

Class ASTEROIDEA

Family ASTROPECTINIDAE

Genus ASTROPECTEN Schultze

ASTROPECTEN POLYACANTHUS Müller and Troschel

Astropecten polyacanthus MÜLLER and TROSCHEL, System der Asteriden, p. 69, 1842 (Red Sea).

Locality.—Eniwetok Atoll; in the lagoon approximately 5 miles north of the anchorage and about 3 miles west of Bogen Island; Taylor, 1947. One small specimen, U.S.N.M. No. E. 7248.

Family LUIDIIDAE

Genus LUIDIA Forbes

LUIDIA MASCARENA Döderlein

Luidia mascarena Döderlien, Die Asteriden der *Siboga*-Expedition, pt. 2, p. 261, fig. 5, 1920 (Mauritius).

Locality.—Bikini Atoll; in the lagoon; Morrison, August 26, 1947. One specimen, U.S.N.M. No. E. 7255.

Note.—This specimen was kindly identified by Prof. Walter K. Fisher.

Family GONIASTERIDAE

Genus CALLIASTER Gray

CALLIASTER ELEGANS Döderlein

Calliaster elegans Döderlien, Bijdragen tot de Dierkunde, Amsterdam, Afl. 22, p. 49, pl. 1, figs. 1–1*b*, 1922 (Solor Strait, 113 meters).

Locality.—Bikini Atoll; off Bikini Island; 400–450 feet; Russell, August 14, 1947. One specimen, U.S.N.M. No. E. 7365.

Notes.—R=45 mm., r=18 mm.; R=2.4 r. This specimen agrees fairly well with Döderlein's type specimen, which was dredged by the *Siboga* in the Solor Strait near Flores in 113 meters, though it is rather more than twice as large. The plates of the disk agree with those of the type. The innermost spines of the carinal row are 6 mm. high, those following decreasing rapidly in height and disappearing at the level of the third superomarginal. The plates of the disk, except for those of the two rows adjoining the superomarginals, each have a prominent central tubercle. There are no pedicellariae.

There are eight superomarginals of which the outer five are in contact in the midradial line. The two interradial superomarginals each bear a prominent spine 2 mm. high on the inner edge, a shorter spine or tubercle in the middle, and usually one or two tubercles near the outer edge. The next two superomarginals on each side bear similar but smaller spines. The following superomarginals bear usually two or three tubercles near the inner edge, one in the middle, and from one to three near the lower edge.

The inferomarginals bear a group of from two to four tubercles near the upper edge, or sometimes a group of three long spines.

Each actinal plate bears a short stout spine.

The adambulacral plates bear two large stout spines on the outer surface and a comb of usually seven subequal furrow spines.

The slight differences between this specimen and the type, the only other specimen known, are probably due chiefly to size and age.

Family OREASTERIDAE

Genus CULCITA L. Agassiz

CULCITA NOVAE-GUINEAE Müller and Troschel

Culcita novae-guineae MÜLLER and TROSCHEL, System der Asteriden, p. 38, 1842.

Localities.—Bikini Atoll; north side of the lagoon, by diving to a depth of 15 feet; March 11, 1946. Three specimens, U.S.N.M. Nos. E. 7960, E. 7961, E. 7962. The diameter of the largest (in alcohol) is 225 mm.

Bikini Atoll; Bokororyuru Island, west side; Morrison, August 12, 1948. One specimen, U.S.N.M. No. E. 6997.

Eniwetok Atoll; Arambiru Island, ocean reef; Schultz, June 3, 1946. One specimen, U.S.N.M. No. E. 7964.

Eniwetok Atoll; Pujiyoru Island, ocean reef; Schultz, June 2, 1946. One specimen, U.S.N.M. No. E. 7963.

Family LINCKIIDAE

Genus NEOFERDINA Livingstone

NEOFERDINA OCELLATA (H. L. Clark)

Ferdina ocellata H. L. CLARK, The Echinoderm fauna of Torres Strait, p. 60, pl. 6, fig. 5 (colored), pl. 31, figs. 1, 2, 1921 (Mer, Murray Islands, Torres Strait).

Locality.—Bikini Atoll; Namu Island, ocean drift on the north side; Morrison, March 30, 1946. One beach-worn specimen, U.S.N.M. No. E. 7364.

Notes.—R=33 mm., r=10 mm.; width of rays at base 12 mm. This specimen agrees well with Dr. H. L. Clark's original description and figures, based upon a single specimen from Mer, Murray Islands, Torres Strait. Since the species was originally described two additional specimens have been recorded, another from Mer and one from Northwest Islet.

Neoferdina ocellata is probably conspecific with *N. cancellata* (Grube), described from a specimen without locality and later recorded from Fiji.

Genus FROMIA Gray

FROMIA BALANSAE E. Perrier

Fromia balansae E. PERRIER, Arch. zool. experim., vol. 4, p. 178, 1875 (New Caledonia).

Locality.—Eniwetok Atoll; East Rigili Island; Morrison, May 30, 1946. One specimen, U.S.N.M. No. E. 7524.

Notes.—R=25 mm., r=7 mm. This specimen agrees well with the figure of the type specimen published by Koehler (Echinoderma of the Indian Museum, Part vi, Asteroidea II, pl. 18, figs. 7, 8, 1910).

FROMIA HEMIOPLA Fisher

Fromia hemiopla FISHER, Proc. U. S. Nat. Mus., vol. 46, p. 213, 1913 (Tonquil Island, Gumila Reef, south of Mindanao, Philippine Islands).

Localities.—Bikini Atoll; in the lagoon; Schultz, March 29, 1946. One specimen, U.S.N.M. No. E. 7264.

Bikini Atoll; 150–180 feet; Schultz, April 13, 1946. One small specimen, U.S.N.M. No. E. 7288.

Notes.—The specimen from the Bikini lagoon has R=16 mm., r=4 mm. In the specimen from 150–180 feet R=5 mm.

FROMIA EUSTICHA Fisher

Fromia eusticha FISHER, Proc. U. S. Nat. Mus., vol. 46, p. 213, 1913 (*Albatross* station 5146, in the vicinity of Siasi, Tapul group, Jolo Archipelago; 24 fathoms).

Locality.—Bikini Atoll (lat. 11°34′30″ N., long. 165°30′30″ E.); 180 feet; August 22, 1947. One specimen, U.S.N.M. No. E. 7287.

Genus DACTYLOSASTER Gray

DACTYLOSASTER CYLINDRICUS PACIFICUS Fisher

Dactylosaster cylindricus pacificus FISHER, Bernice P. Bishop Mus. Bull. No. 27, p. 75, pl. 8, *b*. 1925 (Laysan Island).

Locality.—Bikini Atoll; Schultz, April 13, 1946. One specimen, U.S.N.M. No. E. 7271.

Notes.—R=11 mm. The animal is completely covered with small granules, with one large pointed granule on the summit of each plate.

Genus OPHIDIASTER L. Agassiz

OPHIDIASTER GRANIFER Lütken

Ophidiaster granifer LÜTKEN, Vid. Med., vol. 23, p. 276, 1871 (Tonga Islands).

Localities.—Bikini Atoll; Eninman Island, outer reef flats; Bayer, July 17, 1947. One specimen, U.S.N.M. No. E. 7289.

Bikini Atoll; Bikini Island, lagoon reef; Bayer, August 24, 1947. Two specimens, U.S.N.M. No. E. 7270.

Bikini Atoll. One specimen, U.S.N.M. No. E. 7269.

Bikini Atoll; Draeger, 1946. Five specimens, U.S.N.M. No. E. 7822.

Bikini Atoll; Johnson, May 1946. One specimen, U.S.N.M. No. E. 7621.

Eniwetok Atoll; outer reef, southwest side of Grinem Island; Morrison, May 29, 1946. Two specimens, U.S.N.M. No. E. 7513.

Eniwetok Atoll; East Rigili Island; Morrison, May 30, 1946. Two specimens, U.S.N.M. No. E. 7514.

Rongelap Atoll; outer reef flats of Mellu Island; Morrison, June 19, 1946. One specimen, U.S.N.M. No. E. 7515.

Notes.—In the largest specimen R=33 mm. One of the specimens from Grinem Island is four-rayed.

OPHIDIASTER SQUAMEUS Fisher

Ophidiaster squameus FISHER, U. S. Fish Comm. Bull. for 1903, pt. 3, p. 1,079, pl. 31, figs. 6, 6*a*, 6*b*, pl. 37, fig. 4, 1906 (*Albatross* station 4100, Pailolo Channel, between Maui and Molokai, Hawaiian Islands, 130–151 fathoms).

Locality.—Rongelap Atoll; outer reef flats on the ocean side of Enybarbar Island; Morrison, June 18, 1946. One specimen, U.S.N.M. No. E. 7516.

Notes.—R=40–45 mm. Pedicellariae with straight alveolae are rather numerous on the abactinal surface, some of them raised on smooth elongate elevations. The color is bright red and yellow in broad irregular bands.

OPHIDIASTER LORIOLI Fisher

Ophidiaster lorioli FISHER, U. S. Fish Comm. Bull. for 1903, pt. 3, p. 1,077, pl. 31, figs. 4, 4*a–d*, pl. 39, fig. 3, 1906 (*Albatross* station 3834, south coast of Molokai, Hawaiian Islands, on reefs).

Locality.—Eniwetok Atoll; outer reef, east end of Bogen Island; Morrison, May 21, 1946. One specimen, U.S.N.M. No. E. 7517.

Notes.—All the rays are of different lengths, up to 25 mm. long. Only a single pedicellaria is present, in the center of an interbrachial area on the oral side. There are two small madreporites.

OPHIDIASTER PUSILLUS Müller and Troschel

Ophidiaster pusillus MÜLLER and TROSCHEL, Arch. für Naturg., Jahrg. 10, vol. 1, p. 180, 1844 (Philippines).

Localitiy.—Bikini Atoll; Bokororyuru Island; Morrison, April 30, 1946. One specimen, U.S.N.M. No. E. 7518.

Notes.—R=20 mm. There are seven pedicellariae, each situated on a second superomarginal, two in two of the interbrachial areas, and one in each of the other three.

Genus LINCKIA Forbes

LINCKIA MULTIFORA (Lamarck)

Asterias multifora LAMARCK, Histoire naturelle des animaux sans vertèbres, vol. 2, p. 565, 1816 (?Seas of Europe).

Localities.—Bikini Atoll; in the lagoon; 40–80 feet; August 6, 1947. One specimen, U.S.N.M. No. E. 7272.

Bikini Atoll; Draeger, 1946. Two specimens, U.S.N.M. No. E. 7833.

Bikini Atoll; sandy reef flats behind the outer reef, opposite the center of Bikini Island; Ladd, April 17, 1946. One comet, U.S.N.M. No. E. 7539.

Bikini Atoll; Romurikku Island, reef; Schultz, May 13, 1946. One specimen, U.S.N.M., No. E. 7273.

Bikini Atoll; rocky flats inside outer reef, southeast corner of Enyu Island; Morrison, March 16, 1946. One small specimen, U.S.N.M., No. E. 7566.

Bikini Atoll; lagoon side of Yurochi Island, under rock in tide pool; Morrison, March 22, 1946. One comet, U.S.N.M., No. E. 7542.

Bikini Atoll; outer reef, south (ocean) end of Bokororyuru Island; Morrison, April 30, 1946. One specimen, U.S.N.M., No. E. 7541.

Bikini Atoll; Enirik Island, lagoon tide pool; Schultz and Brock, March 20, 1946. Three specimens, U.S.N.M., No. E. 7486.

Bikini Atoll; Enirik Island; Johnson, 1946. One specimen, U.S.N.M., No. E. 7619.

Bikini Atoll; Johnson, 1946. Two specimens, U.S.N.M., No. E. 7615.

Eniwetok Atoll; Bogombogo Island; Johnson, May 31, 1946. One specimen, U.S.N.M., No. E. 7616.

Eniwetok Atoll; outer reef flats, Pujiyoru Island; Morrison, June 2, 1946. One six-rayed comet, U.S.N.M., No. E. 7545.

Eniwetok Atoll; East Rigili Island; Morrison, May 30, 1946. Thirteen small specimens, of which nine are comets; one comet has six rays and three madreporites, U. S. N. M., No. E. 7537.

Rongelap Atoll; inner reef flats, sandy and rocky, of Burok Island; 1–2 feet; Morrison, July 24, 1946. One specimen, U.S.N.M., No. E. 7540.

Rongelap Atoll; 2 miles west of Busch Island; 120 feet; Taylor, June 20, 1946. One comet, U.S.N.M., No. E. 7538.

Rongelap Atoll; Kabelle Island, lithothamnion ridge, intertidal; Johnson, July 28, 1946. One specimen, U.S.N.M., No. E. 7617.

Rongerik Atoll; Latoback Island, lagoon reef; Bayer and Zimmerman, August 20, 1947. One specimen, U.S.N.M., No. E. 7338.

Johnston Island, outer reef on the northwest side; Bayer, August 28, 1947. One specimen, U.S.N.M., No. E. 7339.

LINCKIA GUILDINGII Gray

Linckia guildingii GRAY, Ann. Mag. Nat. Hist., vol. 6, p. 285, December 1840 (St. Vincent, West Indies).

Localities.—Bikini Atoll; Johnson, May 16, 1946. One specimen, U.S.N.M., No. E. 7612.

Rongelap Atoll; lagoon; Johnson, June 16, 1946. Two specimens, U.S.N.M., Nos. E. 7618, E. 7620.

Notes.—In the specimen from Bikini Atoll one ray is about 35 mm. long, and the other four are 9–10 mm. The color is purple blotched with yellowish white.

LINCKIA LAEVIGATA (Linné)

Asterias laevigata LINNÉ, Systema naturae, ed. 10, vol. 1, p. 662, No. 8, 1758 (Mediterranean and Indian Seas).

Localities.—Eniwetok Atoll; Chinieero Island, reef on outer side of island, close to island but in water on bottom not likely to be exposed at low tide; Taylor and Schultz, May 25, 1946. One specimen, U.S.N.M., No. E. 7775.

Rongelap Atoll; west side of Naen Island; Herald, July 30, 1946. One specimen, U.S.N.M., No. E. 7776.

Notes.—Dr. Schultz recorded the color of the specimen from Chinierro Island as a "bright grayish blue or delft blue." In this specimen R=132 mm., r=23 mm. In the one from Naen Island R=177 mm., r=25 mm.

Family ASTERINIDAE

Genus ASTERINA Nardo

ASTERINA CEPHEA (Müller and Troschel)

Asteriscus cephus (Valenciennes, MS.) MÜLLER and TROSCHEL, System der Asteriden, p. 41, 1842 (Batavia, Java).

Locality.—Eniwetok Atoll; East Rigili Island; Morrison, May 30, 1946. One specimen, U.S.N.M. No. E. 7528.

ASTERINA CORONATA CRISTATA Fisher

Asterina cristata FISHER, Proc. Biol. Soc. Washington, vol. 29, p. 27, 1916 (Ponapé, Caroline Islands).

Localities.—Bikini Atoll; lagoon; 180–200 feet; Schultz, March 29, 1946. One specimen, U.S.N.M. No. E. 7361.

Bikini Atoll; Johnson, May 1946. One specimen, U.S.N.M. No. E. 7622.

Rongerik Atoll; Latoback Island; lagoon reef, from a clump of *Stylophora mardax;* Bayer and Zimmerman, August 20, 1947. One specimen, U.S.N.M. No. E. 7362.

Notes.—The specimen collected by Dr. Schultz at Bikini is 9 mm. in diameter and has two regenerating rays. Dr. Johnson's specimen from Bikini has seven rays, the two longest 12 mm. long, the other five, 9 mm. The specimen from Latoback Island, Rongerik Atoll, has seven rays and is 6.5 mm. in diameter.

ASTERINA ANOMALA H. L. Clark

Asterina anomala H. L. CLARK, The Echinoderm fauna of Torres Strait, p. 95, pl. 7, fig. 8 (colored), pl. 23, fig. 5, pl. 26, figs. 2, 3, 1921 (reef flat, Mer, Murray Islands, Torres Strait).

Locality.—Bikini Atoll; lagoon, about 1 mile inside Bikini Island;

picked off staghorn coral; Bayer, July 16, 1947. One specimen, U.S.N.M. No. E. 7363.

Notes.—R=11 mm., r=5 mm. There are seven rays of nearly equal length. This specimen agrees well with Dr. H. L. Clark's original description. The form, size, and proportions are the same as those of the specimen shown in his colored figure. This species is known from Mer and Lord Howe Islands, from Cape Leveque, Western Australia, and from the Hawaiian Islands. It is abundant at Lord Howe Island.

Family ECHINASTERIDAE

Genus OTHILIA Gray

OTHILIA LUZONICA Gray

Othilia luzonica Gray, Ann. Mag. Nat. Hist., vol. 6, p. 282, December 1840 (Isle of Luzon, Philippine Islands).

Localities.—Bikini Atoll; lagoon, off western end of Bikini Island; Cali, April 29, 1946. One specimen, U.S.N.M. No. E. 7521.

Bikini Atoll; Bikini Island, drift; Morrison, April 5, 1946. One specimen, U.S.N.M. No. E. 7520.

Bikini Atoll; drift from south side of Uorikku Island; Morrison, March 23, 1946. One small specimen.

Bikini Atoll; Airukiraru Island, lagoon side; Schultz, April 17, 1946. Three specimens, U.S.N.M. No. E. 7483.

Bikini Atoll; narrow outer reef on southwest (ocean) side of Ourukaen Island; Ladd, May 2, 1946. One specimen, U.S.N.M. No. E. 7523.

Bikini Atoll; lagoon reef, a poor narrow reef on the northeast side of Ourukaen Island; Ladd and Tracey, May 3, 1946. Two small specimens, U.S.N.M. No. E. 7567.

Bikini Atoll; east side of Chieerete Island, under rocks in tide pools; March 20, 1946. Two specimens, U.S.N.M. No. E. 7139.

Bikini Atoll; Bokororyuru Island, flats inside outer reef on south (ocean) end; Morrison, April 30, 1946. Two specimens, U.S.N.M. No. E. 7519.

Eniwetok Atoll; Rigili Island; Morrison, May 25, 1946. One specimen, U.S.N.M. No. E. 7522.

Eniwetok Atoll; east side of Rigili Island; Morrison, May 30, 1946. Seven specimens, U.S.N.M. No. E. 7490.

Eniwetok Atoll; Lidilbut Island, lagoon reef; Schultz, June 1, 1946. One specimen, U.S.N.M. No. E. 7484.

Eniwetok Atoll; outer reef, east end of Bogen Island; Morrison, May 21, 1946. One specimen, U.S.N.M. No. E. 7491.

Family ACANTHASTERIDAE

Genus ACANTHASTER Gervais

ACANTHASTER PLANCI (Linné)

Asterias planci LINNÉ, Systema naturae, ed. 10, p. 823, Appendix, 1758 (Goa [Portuguese India]).

Locality.—Bikini Atoll; Eninman Island; Bayer, July 17, 1947. One specimen, U.S.N.M. No. E. 7391.

Class OPHIUROIDEA

Family OPHIOMYXIDAE

Genus OPHIOMYXA Müller and Troschel

OPHIOMYXA AUSTRALIS Lütken

Ophiomyxa australis LÜTKEN, Additamenta ad historiam Ophiuridarum, part 3, p. 99, 1869 (Bass Strait, between Australia and Tasmania).

Localities.—Bikini Atoll; one-half mile from Aomoen Island, in the lagoon, in coral at 42 feet; Brock, Kohler, and Herald, July 10, 1946. Four specimens, U.S.N.M. No. E. 7350.

Rongerik Atoll; Latoback Island, lagoon reef; Bayer and Zimmerman, August 18, 20, 21, 1947. Four specimens, U.S.N.M. Nos. E. 7351–E. 7354.

Genus OPHIODERA Verrill

OPHIODERA PUNCTATA, new species

Description.—The disk is stellate with evenly rounded interbrachial borders (dried), and is 27 mm. in diameter; the arms are 160 mm. long.

The disk is thickly studded with minute oval concretions uniformly distributed over the surface but becoming smaller toward the interradial borders; these do not extend out onto the arms, though there may be a few just beyond the ends of the radial shields. The disk thus resembles that of *Ophiomyxa bengalensis* Koehler, but the concretions are smaller and end abruptly at the arm bases. The radial shields are conspicuous, 5 mm. long and about 1.5 mm. broad. Their distal ends are connected across the arm bases by a row of six small rounded contiguous plates.

There are no upper arm plates, but there are a few scattered rounded plates on the aboral side of the first two arm segments.

The interbrachial areas below are naked. The genital slits are long, reaching nearly to the sixth spine-bearing side arm plates. Parallel to the genital slits and near them is a row of eight or nine short black lines at right angles to the slits, the outermost about 2 mm. long and

the following regularly decreasing in length to that just beyond the oral shield, which is merely a dot.

The oral shields are reniform, nearly twice as broad as long. The adoral shields are broad, outwardly adjoining the first under arm plates; they do not quite meet beneath the oral shields. The jaw plates are narrow with parallel sides, so that there is a long triangle of membrane between them. There are four mouth papillae. The outermost is narrow, conical, and sharply pointed. The next is conical, but stouter. The third is broader with almost or quite parallel sides and a broad chisellike tip. The innermost is broadly fan shaped with a curved and finely serrate outer edge and resembles the teeth.

The under arm plates are large and well developed with a sharp angle proximally and a deep distal notch; at the arm bases they are almost in contact; distally they become narrower and somewhat more separated, and the distal notch becomes deeper. At the arm tips they are small and widely separated, the side arm plates almost meeting between them.

The side arm plates beyond the disk bear four, rarely five, subequal spines of which the uppermost is slightly longer and considerably stouter than the others, and the two lowest are the most slender. Toward the arm tips the number of spines becomes reduced to three, and the upper transforms into a stout hook with three or four teeth. Later the middle spine also becomes hooklike. At the end of the arms there are only two spines, both in the form of hooks.

The disk is rather dark brown with numerous white specks and conspicuous dull yellow radial shields. The arms and the oral surface are brownish yellow, with a conspicuous row of short black lines along the genital slits.

Locality.—Bikini Atoll; off Enyu Pass, 700–725 feet; August 22, 1947. One specimen, the type, U.S.N.M. No. E. 7367.

Family OPHIACTIDAE

Genus OPHIACTIS Lütken

OPHIACTIS SAVIGNYI (Müller and Troschel)

Ophiolepis savignyi Müller and Troschel, System der Asteriden, p. 95, Species 12, 1842 (Egypt).

Localities.—Eniwetok Atoll; in the lagoon, approximately 5 miles north of the anchorage, about 3 miles west of Bogen Island; 90–120 feet; Taylor. Five specimens, U.S.N.M. No. E. 7250.

Rongerik Atoll; Bock Island; Bayer and Zimmerman, August 19, 1947. One specimen, U.S.N.M. No. E. 7252.

Rongerik Atoll; Latoback Island, lagoon reef, from a sponge; Bayer and Zimmerman, August 21, 1947. Twenty-one specimens, U.S.N.M. No. E. 7251.

Family OPHIOTRICHIDAE

Genus OPHIOTHRIX Müller and Troschel

OPHIOTHRIX LONGIPEDA (Lamarck)

Ophiura longipeda LAMARCK, Histoire naturelle des animaux sans vertèbres, vol. 2, p. 544, 1816 (Mauritius).

Locality.—Bikini Atoll; Bikini Island, under rocks on the outer reef flat; Bayer, August 8, 1947. One specimen, U.S.N.M. No. E. 7342.

OPHIOTHRIX ELEGANS Lütken

Ophiothrix elegans LÜTKEN, Additamenta ad historiam Ophiuridarum, part 3, pp. 57, 99, 1869 (China Sea).

Locality.—Rongelap Atoll; lagoon, 2 miles west of Busch Island; 120 feet; Taylor, June 21, 1946. Three specimens, U.S.N.M. No. E. 7584.

OPHIOTHRIX VIRGATA Lyman

Ophiothrix virgata LYMAN, Proc. Boston Soc. Nat. Hist., vol. 8, p. 82, 1861 (Kingsmill [Gilbert] Islands).

Localities.—Bikini Atoll; Bikini; Schultz, April 13, 1948. Three specimens, U.S.N.M. No. E. 7345.

Bikini Atoll; in the lagoon; Morrison, August 26, 1947. One specimen, U.S.N.M. No. E. 7344.

Bikini Atoll; Johnson, May 1946. Six specimens, U.S.N.M. No. E. 7625.

OPHIOTHRIX TRILINEATA Lütken

Ophiothrix trilineata LÜTKEN, Additamenta ad historiam Ophiuridarum, part 3, pp. 58, 100, 1869 (Samoan Islands).

Locality.—Bikini Atoll; Bikini Island, lagoon reef; Bayer, August 24, 1947. One specimen.

OPHIOTHRIX EXIGUA Lyman

Ophiothrix exigua LYMAN, Bull. Mus. Comp. Zool., vol. 3, part 10, p. 236, pl. 4, figs. 14–26, 1874 (Philippine Islands).

Locality.—Eniwetok Atoll; in the lagoon approximately 5 miles north of the anchorage, about 3 miles west of Bogen Island; 90–120 feet; Taylor, 1947. One specimen, U.S.N.M. No. E. 7329.

OPHIOTHRIX LEPIDA de Loriol

Ophiothrix lepida DE LORIOL, Mém. soc. phys. nat. hist. Genève, vol. 32, part 1, No. 3, p. 45, pl. 25, figs. 1–1*f*, 1893 (Mauritius).

Locality.—Bikini Atoll; off Bikini Island; 400–550 feet; August 6, 1947. One specimen, U.S.N.M. No. E. 7340.

Note.—This specimen is of the typical form, not the Hawaiian subspecies (*hawaiiensis* A. H. Clark). It was taken from a muriciid alcyonarian.

Family OPHIOCHITONIDAE

Genus OPHIODESMUS Ziesenhenne

OPHIODESMUS DEGENERI A. H. Clark

Ophiodesmus degeneri A. H. Clark, Bernice P. Bishop Mus. Bull. 195, p. 46, fig. 17, a, b, p. 47, 1949 (*Albatross* station 4160, in the vicinity of Moku Manu [Bird Island], Hawaiian Islands, 57–71 meters).

Localities.—Bikini Atoll; in the lagoon, 180–200 feet; Schultz, March 29, 1946. Two small specimens, U.S.N.M. No. E. 7357.

Bikini Atoll; in the lagoon, 150–180 feet; Schultz, April 13, 1948. Two specimens, U.S.N.M. No. E. 7358.

Family OPHIOCOMIDAE

Genus OPHIOCOMA L. Agassiz

OPHIOCOMA ANAGLYPTICA Ely

Ophiocoma anaglyptica Ely, Journ. Washington Acad. Sci., vol. 34, No. 11, p. 373, fig. 1, p. 374, 1944 (Canton Island, reef).

Localities.—Bikini Atoll; Namu Island, west of the north point, under loose flat coral heads; Morrison, April 4, 1946. One specimen, U.S.N.M. No. E. 7141.

Eniwetok Atoll; reef on the ocean side of Pujiyoru Island; Morrison and Cali, June 2, 1946. Six specimens, U.S.N.M. No. E. 7309.

Eniwetok Atoll; under rocks on rocky shore, south end of Rigili Island; Morrison, May 25, 1946. Two specimens, U.S.N.M. No. E. 7574.

Notes.—The apparently quite distinct and easily recognized *Ophiocoma anaglyptica* was described in 1944 from Canton Island in the Phoenix group and has not since been reported. The granules on the disk are lower and broader than those of *O. scolopendrina*, a point not mentioned in the original description.

Mr. Ely has kindly presented his type specimen to the National Museum (No. E. 6847). The National Museum also possesses specimens from Asor Island, Ulithi Atoll, Caroline Islands, collected and presented by Lt. Comdr. F. C. Ziesenhenne, U. S. N. R.

OPHIOCOMA SCOLOPENDRINA (Lamarck)

Ophiura scolopendrina Lamarck, Histoire naturelle des animaux sans vertèbres, vol. 2, p. 544, 1816 (Mauritius).

Localities.—Bikini Atoll; Bikini Island, under rocks in the lower intertidal zone near the outer reef; Morrison, March 7, 1946. Three specimens, U.S.N.M. No. E. 7138.

Bikini Atoll; Namu Island, under loose flat coral heads a little west of the north point; Morrison, April 4, 1946. One specimen, U.S.N.M. No. E. 7142.

Bikini Atoll; Enyu Island, ocean reef; Schultz, May 8, 1946. One specimen, U.S.N.M. No. E. 7348.

Bikini Atoll; rocky flats inside outer reef, southeast corner of Enyu Island; Morrison, March 16, 1946. Five specimens, U.S.N.M. No. E. 7573.

Bikini Atoll; Eninman Island, outer reef flats; Bayer, July 17, 1947. One specimen, U.S.N.M. No. E. 7312.

Bikini Atoll; east side of Yomyaran Island; Morrison, April 10, 1946. Two specimens, U.S.N.M. No. E. 7576.

Eniwetok Atoll; Eniwetok Island, reef at low tide; Ziesenhenne, February 1, 2, 1946. Twenty-two specimens, U.S.N.M. Nos. E. 7333, E. 7334, E. 7335.

Eniwetok Atoll; Arambiru Island, ocean reef; Schultz, June 3, 1946. Three specimens, U.S.N.M. Nos. E. 7328, E. 7329.

Rongerik Atoll; outer reef flats of Latoback Island; Morrison, June 28, 1946. One specimen, U.S.N.M. No. E. 7575.

Rongelap Atoll; Enybarbar Island, northeast end; Schultz, June 18, 1946. Thirteen specimens, U.S.N.M. Nos. E. 7310, E. 7311.

Kwajalein Atoll; Gugegwe Island; Ziesenhenne, February 9, 1946. Thirteen specimens, U.S.N.M. No. E. 7337.

OPHIOCOMA ERINACEUS Müller and Troschel

Ophiocoma erinaceus Müller and Troschel, System der Asteriden, p. 98, 1842 (Red Sea; Indian Ocean).

Localities.—Bikini Atoll; outer reef flats of Bokonfuaaku Island; Morrison, July 3, 1946. One specimen, U.S.N.M. No. E. 7570.

Bikini Atoll; outer reef, south (ocean) end of Bokororyuru Island; Morrison, April 30, 1946. One specimen, U.S.N.M. No. E. 7571.

Eniwetok Atoll; Eniwetok Island; Morrison, June 17, 1946. One specimen, U.S.N.M. No. E. 7140.

Johnston Island, outer reef on northwest side; Bayer, August 28. 1947. Three specimens, U.S.N.M. Nos. E. 7313, E. 7314.

OPHIOCOMA PICA Müller and Troschel

Ophiocoma pica Müller and Troschel, System der Asteriden, p. 101, 1842 (locality unknown).

Localities.—Bikini Atoll; Bikini Island; Bayer, 1947. One specimen, U.S.N.M. No. E. 7563.

Bikini Atoll; Eniairo Island; Bayer, July 21, 1947. One specimen.

Eniwetok Atoll; outer reef flats, northeast side of Arambiru Island; Morrison, June 3, 1946. One specimen, U.S.N.M. No. E. 7562.

Rongerik Atoll; Latoback Island, lagoon reef, from a clump of *Stylophora mardax;* Bayer and Zimmerman, August 18, 1947. One specimen, U.S.N.M. No. E. 7356.

Johnston Island; outer reef on northwest side; Bayer, August 29, 1947. One specimen, U.S.N.M. No. E. 7315.

OPHIOCOMA BREVIPES Peters

Ophiocoma brevipes PETERS, Monatsb, preuss. Akad. Wiss., 1851, p. 465.

Localities.—Eniwetok Atoll; East Rigili Island; Morrison, May 30, 1946. One specimen, U.S.N.M. No. E. 7578.

Rongerik Atoll; outer reef flats on the north side of Bigonattam Island; Morrison, August 21, 1947. One specimen, U.S.N.M., No. E. 7330.

OPHIOCOMA, sp.

Locality.—Bikini Atoll; lagoon; Morrison, August 26, 1947. Six very small specimens, U.S.N.M. No. E. 7355.

Genus OPHIOCOMELLA A. H. Clark

OPHIOCOMELLA CLIPPERTONI A. H. Clark

Ophiocomella clippertoni A. H. CLARK, Smithsonian Misc. Coll., vol. 98, No. 11, p. 7, pl. 1, figs. 1, 2 (as *O. parva*), June 2, 1939 (Clipperton Island).

Localities.—Bikini Atoll; Bikini Island, outer reef; Bayer, July 25, 1947. One specimen, U.S.N.M. No. E. 7347.

Eniwetok Atoll; East Rigili Island; Morrison, May 30, 1946. Two specimens, U.S.N.M. No. E. 7585.

Rongerik Atoll; Bock Island, in algae on the outer reef flats; Taylor, June 27, 1946. One specimen, U.S.N.M. No. E. 7346.

Genus OPHIOMASTIX Müller and Troschel

OPHIOMASTIX MIXTA Lütken

Ophiomastix mixta LÜTKEN, Additamenta ad historiam Ophiuridarum, pt. 3, pp. 42, 99, 1869 (Samoa and Fiji).

Locality.—Eniwetok Atoll; Pujiyoru Island, ocean reef; Morrison and Cali, June 2, 1946. Two specimens, U.S.N.M. No. E. 7321.

OPHIOMASTIX BISPINOSA H. L. Clark

Ophiomastix bispinosa H. L. CLARK, Bull. Mus. Comp. Zool., vol. 61, No. 12, p. 442, pl. 2, figs. 1, 2, 1917 (Paumotu [Tuamotus] Islands, Makemo).

Localities.—Bikini Atoll; Bikini Island; Schultz, April 13, 1946. One specimen, U.S.N.M. No. E. 7324.

Bikini Atoll; in the lagoon; Schultz, March 29, 1946. One specimen, U.S.N.M. No. E. 7326.

Bikini Atoll; Johnson, May 1946. One specimen, U.S.N.M. No. E. 7624.

Bikini Atoll; Bikini Island; Schultz, April 13, 1946. Two specimens, U.S.N.M. No. E. 7327.

Bikini Atoll; one-half mile north of Aomoen Island, in the lagoon; 42 feet, in coral; Brock, Kohler, and Herald, July 10, 1946. Two specimens, U.S.N.M. No. E. 7323.

Bikini Atoll; 30–75 feet; August 15, 1947. One specimen, U.S.N.M. No. E. 7322.

Notes.—In the last-mentioned specimen (E. 7322) the stellate disk is 13 mm. in diameter and the arms are 70 mm. long. The disk is thickly covered with short sharp spinules. There are two tentacle scales on the first four or six pores. The arm spines are usually three, sometimes four; the enlarged uppermost arm spines are 5 mm. long, usually slender, occasionally thickened. The color (as in E. 7324) is olive-brown with the arms obscurely banded.

Specimen No. E. 7323 has the disk 9 mm. in diameter and the arms 50 mm. long. The disk is thickly beset with very small sharp spinules. There are two tentacle scales on the first three, sometimes four, pores. The color is uniform olive-brown, the spines lighter.

Specimen No. E. 7326 has the disk 5 mm. in diameter, and beset with scattered sharp spinelets. There are two tentacle scales on the first two or three pores. There are three arm spines. This specimen agrees well with the type as described and figured by Dr. H. L. Clark.

Dr. Johnson's specimen (No. E. 7624) has the disk 8 mm. in diameter and the arms 50 mm. long. The disk is rather thickly beset with short spines. The arm spines are usually three, occasionally two.

OPHIOMASTIX SEXRADIATA, new species

Description.—The disk is 3 mm. in diameter and the six arms are 14 mm. long. The disk is covered with small imbricating scales and studded with numerous short stout conical spinelets resembling those on the disk of *Ophiocomella clippertoni.*

The general structure is similar to that of *O. clippertoni*, but there are only three arm spines—four on the first three or four side arm plates beyond the disk—and the uppermost arm spine is from half again to twice as long as the others, slender and tapering gradually to a sharp tip; near the arm bases it may be considerably longer than an arm segment. The middle spine is shorter, but usually stouter. The lowest spine is about as long as the middle spine, and usually somewhat more slender.

The disk is light brown, the spinules white. The upper arm plates are light brown with a narrow white border and a narrow white curved band extending across the plates from the spines on one side to those on the other. The under arm plates are light brown with a narrow distal white border. The oral and adoral shields have a dark center and broad white borders.

In two of the specimens all six arms are of the same size. In the remainder, three of the arms are much smaller than the others, indicating autotomous division.

Locality.—Bikini Atoll; in the lagoon; Morrison, August 26, 1947. Four specimens, U.S.N.M. Nos. E. 7359 (type), E. 7360.

Notes.—In spite of the close agreement in the form of the arm plates and the plates of the oral surface, and in the number of arms, with the species of *Ophiocomella*, this little species should be referred to *Ophiomastix*, with which it agrees in the relations of its arm spines and in the general scheme of its color pattern. It does not agree with any of the known species of *Ophiomastix*, none of which are six-rayed in any stage. The color pattern also is unique.

Family OPHIODERMATIDAE

Genus OPHIOPEZELLA Ljungman

OPHIOPEZELLA SPINOSA (Ljungman)

Ophiaracna spinosa LJUNGMAN, Öfv. K. Vet.-Akad. Förh., vol. 23, pt. 6, p. 305, 1867 (Foua).

Localities.—Bikini Atoll; Eninman Island, outer reef flat; Bayer, July 17, 1947. One specimen, U.S.N.M. No. E. 7210.

Rongerik Atoll; Bock Island; Bayer and Zimmerman, August 19, 1947. One specimen, U.S.N.M. No. E. 7212.

Rongerik Atoll; Latoback Island, lagoon reef; Bayer and Zimmerman, August 20, 1947. One specimen, U.S.N.M. No. E. 7211.

Family OPHIOLEPIDIDAE

Genus OPHIURA Lamarck

OPHIURA KINBERGI Ljungman

Ophiura (vel *Ophioglypha*) *kinbergi* LJUNGMAN, Öfv. K. Vet.-Akad. Förh., vol. 23, p. 166, 1866 (Sydney, New South Wales, Australia).

Locality.—Rongelap Atoll; lagoon; 23+ fathoms; Johnson, June 16, 1946. One specimen, U.S.N.M. No. E. 7613.

Genus OPHIOLEPIS Müller and Troschel

OPHIOLEPIS CINCTA Müller and Troschel

Ophiolepis cincta MÜLLER and TROSCHEL, System der Asteriden, p. 90, 1842 (Red Sea).

Locality.—Rongerik Atoll; Latoback Island, lagoon reef; Bayer and Zimmerman, August 21, 1947. Two specimens, U.S.N.M. Nos. E. 7253, E. 7254.

Genus OPHIOPLOCUS Lyman

OPHIOPLOCUS IMBRICATUS (Müller and Troschel)

Ophiolepis imbricata MÜLLER and TROSCHEL, System der Asteriden, p. 93, 1842 (Mauritius; Timor).

Localities.—Bikini Atoll; Eninman Island, outer reef flats; Bayer, July 17, 1947. One specimen, U.S.N.M. No. E. 7209.

Bikini Atoll; Namu Island, outer reef; Morrison, August 7, 1947. One specimen, U.S.N.M. No. E. 7208.

ECHINODERMS FROM OPERATION CROSSROADS, 1946, AND THE BIKINI SCIENTIFIC RESURVEY, 1947

Species	1946	1947
Crinoidea		
Comaster gracilis	----	x
Comanthus bennetti	x	----
Stephanometra indica protectus	x	x
Echinoidea		
Eucidaris metularia	x	x
Chondrocidaris gigantea	----	x
Phyllacanthus imperialis	----	x
Coelopleurus sp	----	x
Echinothrix diadema	x	x
Echinothrix calamaris	x	[1] x
Temnopleurus toreumaticus	x	----
Mespilia globulus	x	----
Desmechinus rufus	----	x
Cyrtechinus verruculatus	x	x
Tripneustes gratilla	x	[1] x
Parasalenia gratiosa	x	x
Echinometra mathaei	x	[3] x
Echinometra mathaei oblonga	x	[2] x
Echinostrephus aciculatus	x	x
Heterocentrotus trigonarius	x	x
Heterocentrotus mammillatus	----	[1] x
Clypeaster reticulatus	----	x
Laganum depressum	x	x
Fibularia australis	x	[2] x
Fibularia ovulum	x	[2] x
Fibularia volva	x	[2] x
Fibularia acuta	----	[2] x
Echinocyamus incertus	----	x
Echinocyamus megapetalus	x	[2] x
Echinocyamus elongatus	x	----
Echinoneus abnormalis	x	----
Echinoneus cyclostomus	x	x
Echinolampas alexandri	x	x
Metalia dicrana	x	----
Brissus latecarinatus	x	----
Maretia ovata	x	x
Asteroidea		
Astropecten polyacanthus	----	x
Luidia mascarena	----	x
Calliaster elegans	----	x
Culcita novae-guineae	x	[3] x
Neoferdina ocellata	x	----

Spieces	1946	1947
Asteroidea—Continued		
Fromia balansae	x	----
Fromia hemiopla	x	----
Fromia eusticha	----	x
Dactylosaster cylindricus pacificus	x	----
Ophidiaster granifer	x	x
Ophidiaster squameus	x	----
Ophidiaster lorioli	x	----
Ophidiaster pusillus	x	----
Linckia multifora	x	x
Linckia guildingii	x	----
Linckia laevigata	x	----
Asterina cephea	x	----
Asterina coronata cristata	x	x
Asterina anomala	----	x
Othilia luzonica	x	----
Acanthaster planci	----	x
Ophiuroidea		
Ophiomyxa australis	x	x
Ophiodera punctata, new species	----	x
Ophiactis savignyi	----	x
Ophiothrix longipeda	----	x
Ophiothrix elegans	x	----
Ophiothrix virgata	x	[2] x
Ophiothrix trilineata	----	x
Ophiothrix exigua	----	x
Ophiothrix lepida	----	x
Ophiodesmus degeneri	x	[3] x
Ophiocoma anaglyptica	x	----
Ophiocoma scolopendrina	x	x
Ophiocoma erinaceus	x	x
Ophiocoma pica	x	x
Ophiocoma brevipes	x	x
Ophiocoma sp	----	x
Ophiocomella clippertoni	x	x
Ophiomastix mixta	x	----
Ophiomastix bispinosa	x	x
Ophiomastix sexradiata, new species	----	x
Ophiopezella spinosa	----	x
Ophiura kinbergi	x	----
Ophiolepis cincta	----	x
Ophioplocus imbricatus	----	x

[1] Johnston Island only.
[2] Collected in 1947 and 1948 (See text, p. 266).
[3] Collected in 1948 only (See text, p. 266).

ISLANDS ON WHICH COLLECTIONS WERE MADE, WITH THE SPECIES COLLECTED ON EACH

BIKINI ATOLL

AIRUKIRARU ISLAND: *Othilia luzonica.*

AOMOEN ISLAND: *Ophiomyxa australis; Ophiomastix bispinosa*, 42 feet.

ARRIIKAN ISLAND: *Fibularia ovulum; Echinocyamus elongatus.*

BIKINI ISLAND and VICINITY: *Comaster gracilis*, 150–265 feet; *Eucidaris metularia*, 150–275, 200–290, 800–900 feet; *Chondrocidaris gigantea*, 800–900 feet; *Phyllacanthus imperialis*, 150 feet; *Coelopleurus*, sp., 800–900 feet; *Echinothrix diadema; Mespilia globulus, Desmechinus rufus*, 800–900 feet; *Cyrtechinus verruculatus*, littoral, 138+, 150, 180–200 feet; *Parasalenia gratiosa*, littoral, 30–75, 40–80, 50–140, 180–200 feet; *Echinometra mathaei; Echinometra mathaei* var. *oblonga; Heterocentrotus trigonarius; Clypeaster reticulatus*, 150–265 feet; *Laganum depressum*, littoral, 21, 24, 27, 30, 36–42, 90, 150, 168 feet; *Fibularia australis; Fibularia ovulum; Fibularia volva; Echinocyamus incertus*, 800–900 feet; *Echinolampas alexandri*, 180, 180–200 feet; *Maretia ovata*, 50–80, 100–140 feet; *Luidia mascarena; Calliaster elegans*, 400–450 feet; *Culcita novae-guineae; Fromia hemiopla*, littoral, 150–180 feet; *Fromia eusticha*, 180 feet; *Dactylosaster cylindricus pacificus; Ophidiaster granifer; Linckia multifora*, littoral, 40–80 feet; *Linckia guildingii; Asterina coronata cristata*, littoral, 180–200 feet; *Asterina anomala; Othilia luzonica; Ophiothrix longipeda; Ophiothrix virgata, Ophiothrix trilineata, Ophiothrix lepida*, 400–550 feet; *Ophiodesmus degeneri*, 150–180, 180–200 feet; *Ophiocoma scolopendrina; Ophiocoma pica; Ophiocoma*, sp.: *Ophiocomella clippertoni; Ophiomastix bispinosa*, littoral, 30–75 feet; *Ophiomastix sexradiata.*

BOKONFUAAKU ISLAND: *Echinothrix diadema; Laganum depressum; Metalia dicrana; Ophiocoma erinaceus.*

BOKORORYURU ISLAND: *Echinometra mathaei; Brissus latecarinatus; Culcita novae-guineae; Ophidiaster pusillus; Linckia multifora; Othilia luzonica; Ophiocoma erinaceus.*

CHIEERETE ISLAND: *Othilia luzonica.*

ENIAIRO ISLAND: *Echinostrephus aciculatus; Echinoneus cyclostomus; Ophiocoma pica.*

ENIRIK ISLAND: *Mespilia globulus; Linckia multifora.*

ENINMAN ISLAND: *Echinometra mathaei; Ophidiaster granifer; Acanthaster planci; Ophiocoma scolopendrina; Ophiopezella spinosa; Ophioplocus imbricatus.*

ENYU ISLAND: *Echinometra mathaei; Heterocentrotus trigonarius; Echinoneus cyclostomus; Linckia multifora; Ophiodera punctata; Ophiocoma scolopendrina.*

NAMU ISLAND: *Eucidaris metularia; Echinothrix diadema; Mespilia globulus; Echinometra mathaei; Echinostrephus aciculatus, Heterocentrotus trigonarius; Echinocyamus megapetalus; Echinoneus cyclostomus; Brissus latecarinatus; Neoferdina ocellata; Ophiocoma anaglyptica; Ophiocoma scolopendrina; Ophioplocus imbricatus.*

OURUKAEN ISLAND: *Echinometra mathaei; Othilia luzonica.*

ROMURIKKU ISLAND: *Linckia multifora.*

UORIKKU ISLAND: *Othilia luzonica.*

YOMYARAN ISLAND: *Ophiocoma scolopendrina.*

YUROCHI ISLAND: *Linckia multifora.*

ENIWETOK ATOLL

ARAMBIRU ISLAND: *Echinothrix diadema; Tripneustes gratilla; Echinometra mathaei; Echinostrephus aciculatus; Heterocentrotus trigonarius; Culcita novae-guineae; Ophiocoma scolopendrina; Ophiocoma pica.*

BOGEN (JIERORU) ISLAND: *Echinothrix diadema; Parasalenia gratiosa; Echinometra mathaei; Laganum depressum; Fibularia ovulum; Metalia dicrana; Astropecten polyacanthus; Ophidiaster lorioli; Othilia luzonica; Ophiothrix exigua; Ophiactis savignyi.*

BOGOMBOGO ISLAND: *Linckia multifora.*

BOGON ISLAND: *Eudicaris metularia; Fibularia australis.*

BUGANEGAN (MUI) ISLAND: *Echinometra mathaei.*

CHINIEERO ISLAND: *Echinocyamus megapetalus; Linckia laevigata.*

EAST RIGILI ISLAND (a rock just east of Rigili Island): *Echinothrix calamaris; Mespilia globulus; Tripneustes gratilla; Echinometra mathaei; Echinostrephus aciculatus; Fromia balansae; Ophidiaster granifer; Linckia multifora; Asterina cephea; Ophiocoma brevipes; Ophiocomella clippertoni.*

ELUGELAB ISLAND: *Fibularia ovulum; Fibularia volva.*

ENIWETOK ISLAND: *Echinothrix diadema; Tripneustes gratilla; Echinometra mathaei; Heterocentrotus trigonarius; Ophiocoma scolopendrina; Ophiocoma erinaceus.*

GRINEM ISLAND: *Echinometra mathaei; Heterocentrotus trigonarius; Ophidiaster granifer.*

LIDILBUT (TEITEIRIPUCCHI) ISLAND: *Mespilia globulus; Echinometra mathaei* var. *oblonga; Heterocentrotus trigonarius; Maretia ovata; Othilia luzonica.*

PUJIYORU (RUJORU) ISLAND: *Echinothrix diadema; Tripneustes gratilla; Echinometra mathaei; Echinostrephus aciculatus; Heterocentrotus trigonarius; Culcita novae-guineae; Laganum depressum; Fibularia ovulum; Linckia multifora; Ophiocoma anaglyptica; Ophiomastix mixta.*

RIGILI ISLAND (southwestern or seaward end): *Mespilia globulus; Echinometra mathaei; Echinostrephus aciculatus; Fibularia australis; Fibularia ovulum; Echinocyamus megapetalus; Echinoneus abnormalis; Echinoneus cyclostomus; Othilia luzonica; Ophiocoma anaglyptica.*

JOHNSTON ATOLL

JOHNSTON ISLAND (F. M. Bayer): *Echinothrix diadema; Echinothrix calamaris; Tripneustus gratilla; Echinometra mathaei; Echinometra mathaei* var. *oblonga; Heterocentrotus trigonarius; Heterocentrotus mammillatus; Linckia multifora; Ophiocoma erinaceus; Ophiocoma pica.*

KWAJALEIN ATOLL

GUGEGWE (BERLIN) ISLAND: *Ophiocoma scolopendrina.*

KWAJALEIN ISLAND: *Echinometra mathaei.*

RONGELAP ATOLL

BUROK ISLAND: *Linckia multifora.*

BUSCH ISLAND: *Mespilia globulus; Heterocentrotus trigonarius; Linckia multifora; Ophiothrix elegans.*

ENIAETOK ISLAND: *Brissus latecarinatus.*

ENYBARBAR ISLAND: *Ophidiaster squameus; Ophiocoma scolopendrina.*

KABELLE ISLAND: *Heterocentrotus trigonarius; Fibularia australis; Fibularia volva; Linckia multifora.*

KIESHIECHI ISLAND: *Comanthus bennetti.*

MELLU ISLAND: *Ophidiaster granifer.*

NAEN ISLAND: *Linckia laevigata.*

RONGELAP ISLAND: *Echinothrix calamaris; Temnopleurus toreumaticus; Mespilia globulus,* 138+ feet; *Cyrtechinus verruculatus,* 138+ feet; *Echinometra mathaei; Echinometra mathaei* var. *oblonga; Laganum depressum,* 138+ feet; *Echinoneus cyclostomus; Linckia guildingii; Ophiura kinbergi,* 138+ feet.

TUFA ISLAND: *Stephanometra indica protectus.*

RONGERIK ATOLL

BIGONATTAM ISLAND: *Ophiocoma brevipes.*

BOCK ISLAND: *Echinostrephus aciculatus; Fibularia australis; Fibularia ovulum; Fibularia volva; Fibularia acuta; Echinocyamus megapetalus; Echinoneus cyclostomus; Ophiactis savignyi; Ophiocomella clippertoni; Ophiopezella spinosa.*

ENIWETAK (ENYVERTOK) ISLAND: *Echinometra mathaei.*

LATOBACK ISLAND: *Stephanometra indica protectus; Echinocyamus megapetalus; Linckia multifora; Asterina coronata cristata; Ophiomyxa australis; Ophiactis savignyi; Ophiocoma scolopendrina; Ophiocoma pica; Ophiopezella spinosa; Ophiolepis cincta.*

RONGERIK ISLAND: *Eucidaris metularia; Laganum depressum.*

ADDITIONAL RECORDS OF ECHINODERMS FROM THE MARSHALL ISLANDS

From time to time scattered references to specimens from the Marshall Islands have appeared in the literature, based upon material that has found its way into museums from various sources, much of it from the Reverend B. G. Snow, a resident missionary. Most of the specimens are from Ebon (Boston Island), with some from Jaluit (Bonham Island), both in the extreme south of the Marshall group.

The only systematic collecting that has been done in the Marshalls was by the Swedish expedition to the South Sea Islands under the leadership of Dr. Sixten Bock in 1917. A report on the Ophiuroidea of this collection was published by Prof. René Koehler in 1927 (Göteborgs Kungl. Vet. Vitt. sam. Handl., vol. 33, No. 3), which lists 16 species, mostly from Jaluit and Ebon, of which the following are not represented in the present collection.

Ophiomyxa brevispina von Martens (Jaluit)
Amphilimna sexradiata (Duncan) (Jaluit)
Ophionereis porrecta Lyman (Ebon)
Ophiothrix demessa Lyman (Jaluit)
Ophiothrix galatheae Lütken (Jaluit)
Ophiothrix triloba von Martens (Jaluit)
Ophiopezella dubiosa de Loriol (Jaluit)

It is probable that Professor Koehler's *Ophiothrix galatheae* is the same as *O. longipeda* of the present list.

The Crinoidea of this expedition, all collected by Dr. Chr. Hessle, were described by Professor Torsten Gislén in 1940 (Kungl. Svenska Vetenskapsakademiens Handlingar, ser. 3, vol. 18, No. 10). He re-

corded five species of which four are not represented in the present collection. These are:

Eudiocrinus tenuissimus Gislén (Jaluit)
Lamprometra palmata (J. Müller) (Ebon; Jaluit)
Cenometra bella var. *magnifica* Gislén (Jaluit)
Dorometra nana (Hartlaub) (Ebon; Jaluit)

Earlier records of crinoids from the Marshall Islands are *Stephanometra protectus* from Ebon, collected by the Reverend B. G. Snow in 1877 (A. H. Clark, Bull. Mus. Comp. Zool., vol. 51, p. 242, 1908, as *Himerometra heliaster*), recorded also by Gislén and represented in the present collection; and *Lamprometra palmata*, also collected by Mr. Snow at the same time (Hartlaub, Mem. Mus. Comp. Zool., vol. 27, No. 4, p. 409, 1912, as *Antedon brevicuneata*).

Dr. Hubert Lyman Clark in 1915 (Mem. Mus. Comp. Zool., vol. 25, No. 4, p. 343, No. 1368) recorded *Ophiolepis superba* from Ebon, where it had been collected by Mr. Snow in 1877. It has not since been reported from the Marshall Islands.

Additional species known from Johnston Island (A. H. Clark, Bernice P. Bishop Mus. Bull. 195, p. 119, 1949) are: *Echinostrephus aciculatus*, *E. molaris*, *Brissus latecarinatus*, *Culcita novae-guineae* forma *novae-guineae*, *Acanthaster planci*, *Mithrodia fisheri*, and *Ophiactis savignyi*.

U. S. GOVERNMENT PRINTING OFFICE: 1952